



DIESEL-ELECTRIC **PULLMAN** SETS

See Page 7

VOL. LXXXIII No. 2145

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LONDON, JUNE 25, 1960

PRICE ONE SHILLING

Modernisation in Leeds

VET another important step forward in the progress of railway modernisation Yorkshire was taken on Friday, June 17, when Sir Linton Andrews, editor, Yorkshire Post, formally opened a completely new section of the recently modernised railway traction depot at Leeds Neville Hill. He drove a multiple-unit diesel set off the depot reception line into the shed to inaugurate it; he was then introduced to shed staff by Mr. T. H. Summerson, chairman of the North Eastern Area Board; a vote of thanks was proposed by Mr. A. Dean, assistant general manager, modernisation, N.E. Region, who presented a memento of the occasion. Formerly a steam shed only, Neville Hill motive power depot is situated two miles east of Leeds City Station on the north side of the main line to York and Hull. The new section adds facilities for servicing and maintaining 250 diesel cars, of which 117 are already in regular service. There is also provision for the maintenance of diesel shunting locomotives in the modernised section of the depot. The steam shed, now modernised, houses 42 steam locomotives. This portion can be adapted for diesel-electric and electric locomotives easily and cheaply. A description of the modernised facilities appears elsewhere in this issue. On the day it was opened opportunity was taken to show members of the area board the new mar-shalling yard sites at Healey Mills near Ossett, and Stourton between Rothwell and Leeds. The former involves a considerable diversion of the River Calder. schemes and the merging of the Central and City station facilities in Leeds will lead to a very considerable rationalisation of West Riding facilities.

Bus Traffic Above Prewar Level

TYNITED KINGDOM bus companies were maintaining passenger traffic at some-thing like 50 per cent above the prewar level despite intense competition from other forms of transport, said Mr. John Spencer Wills, chairman, at the annual meeting of B F T Omnibus Services. Limited. "The B.E.T. Omnibus Services, Limited. Englishman is travelling a great deal more than he used to and fortunately he is still doing much of his travelling by bus and coach. There can be little doubt that he will continue to do so as long as bus travel retains the advantages of cheapness, reliability and comfort—with no parking problems at the end of the journey," said Mr. Wills. The alternative to our comprehensive system of public transport could be seen in Los Angeles, where there was a vast road system designed for universal travel by private car and many square miles were set aside for parking, but the built-up area, housing a population about twice the size of Birmingham's, extended in one direction over about 130 miles. It was no cause for wonder that the traffic planners of some American cities were coming to regard their public transport system as a pearl beyond price and basing their plans on giving priority of movement to the bus, by such means as reserved traffic lanes. It seemed obvious that to accept into the heart of a town all the vehicles wishing to go and park there would be courting disaster. The most sensible alternative was to prohibit kerbside parking in town centres, giving adequate parking facilities at points well served by road transport; to make by-pass roads for through traffic; and to give priority within the town for buses and other essential traffic, but what this country needed above all was more long-distance motorways connecting major populated areas.

Civils Conversazione

THAT ever-fresh event, the summer conversazione of the Institution of Civil Engineers, devoted more attention to transport this year, as is perhaps natural with Sir Herbert Manzoni, a city engineer, in the presidential chair. Bridges from such different spheres as Tasmania (the Tasman Bridge over the Derwent Estuary), Perth, Western Australia, Ghana, Newfoundland and the Tamar were a feature of the models displayed. These also included cutaway

CURRENT TOPICS

models of Notting Hill Gate and Oxford Circus (with Victoria Line) stations shown by Mr. C. E. Dunton, chief civil engineer of London Transport Railways, and of the Trav-o-lator scheme now being installed at the Bank by the Southern Region for Waterloo and City tube passengers. Mr. A. H. Cantrell, chief civil engineer of that region, also exhibited a model of a scheme for developing Cannon Street Station and some aerial photographs. Mr. M. G. Smith, chief civil engineer, Western Region, was responsible for an interesting group of items-a pre-

down slow line. "It is extremely difficult to understand how he could have failed to see the bright red light of the slow line signal No. 25, and why he thought that he saw that signal at yellow with a right-hand direction indicator when in fact it was red and signal No. 26 was green with a left-hand indicator. A medical examination showed that he is quite fit and that his eyesight and colour vision are normal." The facts of the case have been made known to the Medical Research Council which is assisting the B.T.C. in a special investigation into human

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fabricated half-through type girder bridge for spans of up to 110 ft., a tubular roof structure with suspended glazing as is being used at Plymouth and a method, exemplified at Pontnewynydd, of reducing the eccentricity of prestressing forces in pretensioned concrete Multi-storey garages, bulk cargo handling on the Shannon estuary and the Mitchell design for a nuclear propelled submarine cargo vessel (50,000 tons displacement, 28,000 tons of iron ore capacity, 25 knots at 300 ft. operating depth) were other exhibits of transport interest

Pines Express in Sidelong Collision

AT 4.51 p.m. on November 23 last the 9.45 a.m. Bournemouth-Manchester (the Pines Express) and the 3.59 p.m. Buxton—Manchester diesel train came into sidelong collision when approaching Slade Lane Junction, Levenshulme, on the Crewe -Manchester main line. Three passengers and a railwayman were slightly injured; the engine and tender and three leading coaches of the express and four coaches of the diesel train were derailed and both track and signalling extensively damaged. The weather was fine and clear. Reporting on the accident Colonel D. McMullen, inspecting officer of railways, attributes its cause to the failure of the local train driver to stop at the home signal protecting the converging junction, which was at danger. The signalling equipment was in proper working order. The driver of the express applied his brakes as soon as he realised that the diesel train had passed the slow line signal, but his train was then travelling at about 35 m.p.h., which was within the authorised speed, and he could not have avoided the collision. It seemed quite evident, states the inspecting officer, that the diesel train driver saw the down fast line signal become clear for the express and that he took it to apply to his train on the

failures of this nature. Neither of the guards complied with Rule 148 which requires them to keep a good look-out when approaching important junctions. Had the guard of the diesel train done so "he would undoubtedly have seen that the slow line signal was at danger and could have stopped the train."

New British Marine Engine

PLANS for the production of a six-cylinder 19,800-h.p. marine engine, which would be the 'lightest, cheapest and most advanced marine engine in the world,' have been announced by William Doxford and Sons (Engineers), Limited, Sunderland. Mr. R. Atkinson, managing director, recalled that the Doxford company was at present testing the first of its new P-type engines, which developed 10,000 h.p. The advantages of this engine were its reliability, low fuel consumption, and its cheap and easy main-The new 19,800-h.p. engine, stated Mr. Atkinson, would be modelled on the P design, and the first would be completed at the end of 1961. He added that within two years his firm had designed, built, tested and proved the P engine. Recently Lord Hailsham, Minister for Science, had stated that there was not a British-designed diesel engine available over 10,000 h.p. He hoped that Lord Hailsham would now tell the world that Britain could build engines up to nearly 20,000 h.p. During his visit to the North East Coast last week, Mr. Ernest Marples, Minister of Transport, watched one of the new P-type engines undergoing test-bed trials. The engine, which weighs 375 tons, is to be installed in a 20,000-ton tanker on order at Sir James Laing and Sons, Sunderland, for Thorvald Berg of Norway. At present, traditional Doxford engines are built under licence by 23 British and foreign firms, and more than 1,500 ships at present in service have Doxford engines.

National Engineering Laboratory Report THE decision to give priority to projects which are directed towards immediate

industrial problems, or which promise application within a relatively short period, announced in the annual report of the National Engineering Laboratory Steering Committee (Mechanical Engineering Research 1959, published this week for D.S.I.R. by H.M.S.O., price 4s. 6d. net). Three projects selected as being particularly important were investigations in the machine-tool field, the development of hydrostatic power trans-missions and work on the cold extrusion of The results of this work were seen by more than 2,000 visitors to the laboratory's recent open days. Important advances were evident in the use of moiré fringe techniques for the reduction of inaccuracies in machine for the reduction of inaccuracies in machine tools in a system developed jointly by the National Engineering Laboratory and the National Physical Laboratory. The results of practical application of the system by N.E.L., in collaboration with David Brown Industries, Limited, can be seen on a 30-in. gear hobbing machine exhibited at the Machine Tool Exhibition at Olympia from June 25, which has such an error-correcting system applied to the final drive table. The preparation time and costs of applying moiré fringe techniques is considerably reduced by a photographic method developed by N.E.L. of producing the necessary circular gratings quickly and accurately. A 30,000-line grating can be produced by photography in three to four hours, compared with 10 days when a circular dividing engine is used; furthermore, greater accuracy is achieved.

Hydrostatic Power Transmissions

TWO types of hydrostatic transmission of simple and economic construction are being developed at N.E.L. One is an exceptionally quiet high-efficiency unit suitable for use in ships and heavy road vehicles; the second is a cheaper unit for such applications as machine tools, where high efficiency is less important than a steplessly variable speed-torque characteristic. Both are now being taken up for industrial use. The high-efficiency unit, developed initially for use by the Admiralty, comprises an axialcylinder swash-plate pump, which can also run as a motor. A 30-h.p. prototype has been built in the laboratory and operated successfully at 3,000 p.s.i. Noise, traditionally one of the problems of hydrostatic transmissions, has been brought down to an exceptionally low level, as low as that of a conventional screw pump. The pump is a simple design and has several unique features. In contrast to accepted practice, the swash-plate position is variable and the cylinder block is mounted. is variable and the cylinder block is mounted rigidly on the shaft; ball and roller bearings have been eliminated completely (hydrostatic oil bearings are used, giving improved life and less noise); and there is a port plate floating on pressure-balanced oil films between the rotating cylinder block and the fixed casing. The noise level depends on the angular position of the plate, which is adjusted automatically to give minimum noise.

Cold Extrusion of Steel

A NOTHER field in which N.E.L. is making progress is the cold extrusion of steel, which has been used very little in Britain though carried out extensively in Germany and America. One of the reasons has been the shortage of information on design procedures. Comprehensive data are now available from N.E.L. on the effect of different process variables on the pressures required to extrude various products in a wide range of low carbon and alloy steels. Information is also available on the flow of metal during extrusion and on the properties of the extruded product. Several British firms are now trying cold extrusion of steel as a production process; in the production of pins, sparking plug bodies, ball race housings and other hollow components, extrusion from unheated billets provides high production rates, good surface finish and enhanced mechanical properties, due to the cold working. Many components require no machining at all and in any case there are machining reductions and savings of up to 70 per cent in materials.

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The Editor is prepared to consider contributions offered for publication in MODERN TRANSPORT, but intending contributors should first study the length and style of articles appearing in the paper and satisfy themselves that the topic with which they propose to deal is relevant to editorial requirements. In controversial subjects relating to all aspects of transport and traffic this newspaper offers a platform for independent comment and debate, its object being to encourage the provision of all forms of transport in the best interests of the community.

Rationalisation and Modernisation

AS the process of railway modernisation and rationalisation goes on there is increasingly something to show for it. Some of the innovations, such as the intro-duction of the *Midland Pullman* on July 4, are spectacular in the extreme and should go far to restore the public reputation of British Railways as well as add lustre to the railway rolling stock construction industry of this country. Others will go almost unremarked, but in the end will play their part in the metamorphosis of the system to bring it into line with late twentieth-century needs; some schemes will enhance revenue and the principal merit of others is the economy that must follow from their adoption. Such schemes as those now devised for the consolidation of freight facilities in the towns of the West Riding, where half a dozen companies competed for railway business until 1923, will be money-spinners because the service will become more attractive and at the same time misers in reducing costs. One new yard should cover its new capital in three years because of the economies that will be derived. At the opening of the new Neville Hill motive power depot at Leeds on June 16, Mr. T. H. Summerson chairman of the North Eastern Area Board, said the depot bore the characteristic stamp of the new railway service in Britain; it was well designed, suited to its purpose and a good place in which to work. It would make its contribution towards bringing British Railways, after their years in the wilderness, right back into the public esteem for them which even now was reawakening.

Barnsley Improvement

THE complex network of railway lines running through and around Barnsley serves as a lasting reminder of the railway mania of the last century. Even to the experienced railwayman, its profusion of routes is confusing, making it difficult to retain a clear mental picture of the whole complicated layout. At the same time, it has presented present-day railway management with an interesting challenge-to reduce the system to an economically viable size and one more in conformity with the needs of the mid-twentieth century. Our attention has been drawn to the way in

between the new junction and Court House. This must be typical of many similar problems in other parts of the country, but so successfully and speedily has the process of rationalisation been carried out in Barnsley under a vigorous local management that we describe it on page 3; it may well serve as a model for similar exercises elsewhere. The money savings are large—over £300,000 a year, with an immediate saving of costly renewal works. This remarkable story has a moral-if one asks the local officers how they have been able to achieve all this, and in such a short time, their answer is simple and revealing. They say that it is entirely due to two things, the Eastern Region reorganisation under one traffic management and the elimination of penetrating lines. The new organisation has enabled the traffic manager to make rapid decisions, after reviewing problems with the district engineer and the local traffic officers, which were not possible under the old departmental organisation; similar rapid decisions can be made by the line traffic manager at his level. Elimination of the penetrating lines has removed also from the ocal plane regional differences and jealousies which could previously retard and bedevil progress. The signal success of rationalisation in the Barnsley area is, therefore, as much a tribute to the Eastern Region traffic reorganisation as it is to the drive and ability of railway management at all levels. It can be emulated with benefit in many places.

Scottish Experiment

BY a different process the Scottish Region is to make a bold experiment to develop passenger traffic between Inverness and Aberdeen with two threecoach diesel expresses in each direction daily, covering the overall journey in 21 hr. with stops at Keith, Elgin, Forres and Nairn. Each train will have a mini-buffet and will have 18 first-class and 144 second-class seats. These inter-city trains will have the benefit of observation saloon ends and pleasure travel will be additionally stimulated by cheap day return fares, Inverness to Aberdeen being 18s. 6d. The new trains begin on July 1 and will continue to the end of the summer timetable. It is hoped that they will also be useful to business people. If the experiment is a success the fast service will be reintroduced next year. Announcing the service to a meeting in Aberdeen, Colonel Donald H. Cameron of Lochiel, chairman of the Scottish Area Board, spoke of the need for the community to make use of its railways if they were to survive and repeated his predecessor's plea: For goodness sake, use us and criticise usdon't neglect us and criticise us!

Pullman Progress

JULY 4 will witness the introduction of the Midland Pullman diesel-electric sets, designed by the famous builder Metropolitan-Cammell, and incorporating a new Westinghouse electro-pneumatic brake, Metro - Schlieren bogies, North British (M.A.N. engines) and General Electric traction equipment and Stone air conditioning, lighting and heating plant powered by Rolls-Royce diesel engines coupled to Tonum alternators. This is not only a land-mark in British Pullman service history but triumph which gives this country the equivalent of the Trans-Europ-Express facilities-luxurious comfort and convenient speed. We take the opportunity of saluting speed. We take the opportunity of saluting this achievement by commencing publication of a review of George Mortimer Pullman's life work; he began to revolutionise railway travel in the United States just over a century ago. We believe the new dieselelectric self-contained Pullman sets will emulate the success of the Master Cutler. Since September, 1958, that diesel locomotive-hauled six-coach Pullman train has made four trips daily Monday to Friday, travelling more than a quarter-million miles, running 4,500 hours in traffic at an average speed of nearly a mile-a-minute. In less than which this problem in rationalisation is being two years it has carried 160,000 passengers tackled at Barnsley by the recent closure of on the London and Sheffield route and Barnsley Court House Station, following the earned nearly half a million pounds of construction of a new junction between the revenue. That is the pattern of our former G.C. and Midland lines at Quarry rejuvenated railway system, on which the Junction and the abandonment of the line results of modernisation are now fructifying.

NEWS SUMMARY

On Friday of last week, Sir Linton Andrews,
Editor, Yorkshire Post, inaugurated the
rebuilt Neville Hill traction depot, North Eastern Region. This depot, described on page 14, now provides for 42 steam locomotives, 250 railcars and for servicing diesel locomotives. The Area Board also inspected other rationalisation schemes in the West Riding.

Implementation of the Guillebaud report is Implementation of the Guillebaud report is still hanging fire on the question of packet port workers and railway staffs are expressing restiveness. A meeting with representatives of the railway port workers was being held on June 22.

On Monday it was announced that Sir Matthew Slattery, chairman and managing director of Short Brothers and Harland,

Limited, is to succeed Sir Gerard d'Erlanger as chairman of B.O.A.C. next month. For other appointments see page 23.

Tranmere oil terminal, jointly sponsored by Mersey Docks and Harbour Board and the Shell group, has been brought into service and is described on page 16.

At the annual meeting of the Channel Tunnel Company in London shareholders were told by the chairman, Mr. Leo d'Erlanger, that told by the charman, Mr. Leo d Erlanger, that talks are still going on with civil servants and others on the project and it would be at least several months before a firm decision was reached whether to proceed with or to drop the idea. He emphasised that the proposals in the study group report were only tentative. It was erroneous to assume that some form of Government subsidy was involved in the proposals.

RAILWAY RATIONALISATION AT BARNSLEY

Concentration on Exchange Station

LARGE SAVINGS BY EASTERN REGION

N the early part of the railway era Barnsley, although recognised as a town on the Yorkshire coalfield, was still mainly known for the manufacture of coarse linen. elevated position in broken country, which earned it the name of "Bleak Barnsley," prevented it from being served by main routes. The North Midland from Derby to Leeds in 1840 passed over two miles to the east at Cudworth, where a station was opened to serve Barnsley. The first railway to serve the serve Barnsley. The first railway to serve the town closely had the formidable title of the Sheffield, Rotherham, Barnsley, Wakefield, Huddersfield and Goole; it was authorised in 1846 to join the Sheffield and Rotherham Railway via Barnsley with Horbury Junction on the Manchester and Leeds, but almost immediately was divided at Barnsley between the M. and L., or Lancashire and Yorkshire, as it became, and the South Yorkshire, which was absorbed in due course by the Manchester, Sheffield and Lincolnshire.

Passenger Service Developments

The Lancashire and Yorkshire passenger service to the then Regent Street station began on January 1, 1850; the South Yorkshire caught up 18 months

named the L. and Y. station Low Town on June 2, 1924, and renamed it again Barnsley Exchange the following October.

Train Services

At the height of the railway era, in 1899, train services comprised 11 Midland trains between Sheffield and Barnsley via Elsecar and 17 basic connecting services between Barnsley Court House and Cudworth on the main line; these served also to connect with the Hull, Barnsley and West Riding Junction company's service to Hull. Besides the Great Central service from Penistone to Barnsley Court House and Doncaster, the G.C. operated 10 Court House and Doncaster, the G.C. operated 10 each way between Barnsley and Sheffield and a basic service of six each way (with Saturday extras) from Court House to Staincross (via the Barnsley Coal Railway), Notton and Royston, Ryhill, Hare Park, Wakefield West Gate, Holbeck and Leeds Central. The two Sunday trains went via Stair-

Central. The two Sunday trains went via Stairfoot, where they reversed.

The Lancashire and Yorkshire service from Barnsley comprised 11 trains to Wakefield Kirk Gate. In 1921 a curious one-way Saturday service ran under L.N.W. auspices to Barnsley from Leeds out of the Great Northern Leeds—Dewsbury circular service. In grouping days the L.M.S.R. and L.N.E.R. continued the old pattern from 1923 to 1948 with minor variations 1948, with minor variations

enabled a saving to be made of some £200,000 which would have had to be spent on the imminent renewal of bridges forming part of the viaduct. It has cost a short new embankment on the connecting line, removal of the bridge by which the Midland crossed the G.C., a new signalbox at Quarry Junction and the alteration of levels there—by as much as 14 ft. at one point—to ease otherwise unnecessarily steep gradients on both lines. The physical improvement is, in fact, considerable. The immediate benefits of the withdrawal of the slow passenger services were an annual saving of £40,000 on operating costs and the closure of five stations.

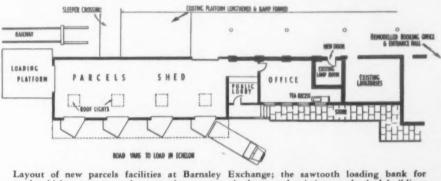
But by enabling Oaks Viaduct (on the Midland Cudworth route) to be closed also—with the abandonment of several miles of track from Barnsley West Junction to the viaduct—further heavy expenditure, amounting to £30,000 on our great repairs to the viaduct, was saved. This well-known Barnsley landmark, which stands as

Railways in the Barnsley area after rationalisation Stairfoot—Nostell line as far as Wharncliffe—Woodmoor Colliery and abandon it beyond.

POSSIBLE FUTURE PRUMIN

Goods Depot Reduction

Meanwhile, the goods depots at Oakwell and Old Mill Lane were being quietly closed and the traffic concentrated at the main Barnsley depot. The latter is, in fact, a complex of three depots, at three different levels—Court House above, Central in the middle and Exchange below—a legacy from the



Layout of new parcels facilities at Barnsley Exchange; the sawtooth loading bank for road vehicles saves space between the new parcels depot and existing goods shed buildings



Barnsley Exchange Station today, with multiple-unit diesel trains on the new through Sheffield—Leeds service; the left-hand platform is new and the waggons stand on the former motive power depot site

MONK BRETTON JAM. 28.1870 CAKWELL CO MT OSBORNE W. JCT. BARNSLEY MAIN **EXCHANGE (PASS.)** ARDSLEY PINDAR OAKS ORIGINALLY SREWEGE MT. OSBORME E. JCT. NEW QUARRY J^{ET} CONNECTION STAIRFOOT STAIRFOOT

Historical sketch map showing railway development at Barnsley

later with four trains each way daily between Doncaster and Barnsley. A service from Sheffield to Barnsley, with a reversal at Wombwell, was added on September 4, 1854. The Manchester, Sheffield and Lincolnshire leased the South York-Sheffield and Lincolnshire leased the South Yorkshire in 1864, but in the meantime the M.S.L. had made its own approach from Penistone, arriving at Summer Lane on November 1, 1855 (freight service came on the scene in December) and obtaining access to the L. and Y. station on February 17, 1857. The M.S.L. paid a toll for using eight chains of L. and Y. line into the station and took on some of the costs of the L. and Y. station at that time, but with typical fickleness vacated it for Court House when the Midland at last made a branch into Barnsley.

Midland Approach

In the early sixties the Barnsley area was boom ing, with 60 coal pits in the vicinity, according to one account, and the Midland felt it should make a better approach than the two-mile or more drive

Under nationalisation, after one or two vacillations, the rearrangement of regional boundaries has resulted in the entire Barnsley area coming under the aegis of the Eastern Region. This has immediately the aegis of the Eastern Region. This has immediately added to the facility with which rationalisation projects can be carried out. The legacy of railway competition in the latter half of the 19th century is well illustrated in one of the accompanying diagrams and certainly left plenty of scope for some simplification of facilities. And so the scene was set for the spectacular metamorphosis now being carried through.

Stopping Losses

The first problem was to stop the drain on railway finances caused by the hopelessly uneconomic slow passenger services running from Barnsley to Cudworth, Doncaster and Penistone. Meetings were held with the Barnsley authorities, when it was agreed that if those services were withdrawn with the consent of the T.U.C.C., diesel multiple-unit services would be introduced between Barnsley and

a memorial not only to the railway mania but now also to modern railway rationalisation, awaits its final removal when the re-routeing of a water main which it still carries is shortly completed.

Finally, the withdrawal of the slow passenger services was an essential preliminary to the closure of Court House and the construction of the new junction, since it enabled the smaller one-platform Exchange Station to cope alone with the remaining Exchange Station to cope alone with the remaining passenger service to Leeds and Sheffield. For this purpose the motive power depot at Exchange was demolished and a southbound platform with shelter erected on part of the site and coupled to the original platform by a footbridge.

Freight Rationalisation

Concurrently with these developments on the passenger side, planning was proceeding with the rationalisation of the freight services in the

past when the former railway companies each found their separate ways into the town. The ultimate plan is to concentrate the traffic in the middle and lower depots and to close Court House goods yard, which, together with the passenger station, will free several acres of valuable land in the very heart of Barnsley for redevelopment.

Plans were also proceeding for the closure of the Barnsley Motive Power Depot and this took place in January, 1960, the work being transferred to Mexborough. As already stated, the building has been pulled down to allow a second platform to be built at Barnsley Exchange and a useful area of land adjacent to the station has been freed by the closure of the locomotive yard for use as a car park, closure of the locomotive yard for use as a car park, or an engineer's stock yard. It has also made a useful contribution to smoke abatement in Barnsley.

Thus, rationalisation in the Barnsley area has so far produced the surprising bag of six passenger









The new Quarry Junction site, showing earthwork on the new bank leading down from the former Midland line to the former Great Central tracks; ballast train on the new bank on April 18, 1960; the Midland bridge girders in course of removal by the Gorton crane on April 24; extreme right, the new Quarry Junction signalbox on April 24 before the erstwhile Great Central track was raised—hut and signalbox doors are at the new track level since achieved

from Cudworth Its branch from Cudworth to Court House via Monk Bretton included the imposing iron Barnsley (or Oaks) viaduct, recently condemned, Barnsley (or Oaks) viaduct, recently condemned, and was available for goods traffic on June 28, 1869. The passenger service of connections to Cudworth began on May 2, 1870; on the last day of the same month the M.S.L. diverted its Penistone—Barnsley—Doncaster trains through Court House.

Last M.S.L. passenger service was over the Barnsley Coal Railway, which, long mooted, had been opened in 1870; it ran via Nostell and Wakefield to Leeds Central from 1882. Finally the Midnard decided to emporte with the land decided to compete with the old-established M.S.L. (by then Great Central) Sheffield—Barnsley M.S.L. (by then Great Central) Snemeld—Barnsley service and built a new line for the purpose which was opened on July 1, 1897. Incidentally, the Hull and Barnsley Railway came no nearer Barnsley than Cudworth, Monk Bretton and Stairfoot. It was not until 1905 that through Hull and Barnsley trains ran from Hull to Sheffield over the Midland route from Cudworth; Hull to Barnsley services were advertised, but involved a change at Cudworth. After grouping, the L.M.S.R.

Leeds and Barnslev and Sheffield. This was done. with the Leeds service running to Exchange and the Sheffield service to Court House. The linking at Easter of this year of the Great Central line from Barnsley Exchange to Stairfoot and Doncaster to the Great Miles to the Court House. the former Midland line from Court House to Chapeltown and Sheffield, by means of a new junction at their crossing point, Quarry Junction, now enables, as from April 19, through diesel railcar services for the first time to run from Sheffield to Leeds via Barnsley; furthermore a new through service from Barnsley to London St. Pancras runs for the first time for many years and commenced on June 13. Buses of the associated Yorkshire Traction Co., Limited, which has a bus station adjacent to Exchange, usefully provide the connections made by the train services of the past—and for the most part more frequently. A convenient addition to car park facilities at Exchange will be made

as soon as practicable.

The new junction, by allowing Court House Station to be closed and the line to Quarry Junction (which runs on a viaduct) abandoned, has

Barnsley area. The first fruits of this planning were the closure of the yards at Stairfoot and Pindar Oaks, the traffic previously dealt with in these yards being concentrated elsewhere, largely at Wath. A substantial annual saving amounting to £170,000 ensued without any reduction in oper-

ating efficiency.

The expensive dual connections to collieries in The expensive dual connections to collieries in the area, at Barnsley Main, Barrow, Rockingham and Wombwell Main, were singled to the G.C. line in agreement with the N.C.B. and the long Midland Wharncliffe Colliery branch was abandoned, together with Ardsley sidings, enabling further useful economies to be made in working costs, maintenance and signalling of £52,000 per annum. The long connecting curve from Old Oaks Junction on the Barnsley—Stairfoot line to Oakwell Junction on the Stairfoot—Nostell line was abandoned and negotiations were opened with the N.E. Region negotiations were opened with the N.E. Region and the N.C.B. to close the four-mile long G.C. connection from Stairfoot North Junction to Houghton Main Colliery (which is also served by two other connections) and to single the

stations (including the large one at Court House), two goods depots, three shunting yards, one motive power depot, four colliery connections and a numer of signalboxes, bridges and viaducts, and many miles of running track. It has saved expenditure on repairs and renewals of at least £250,000 and working expenses totalling some £300,000 per annum. It has vastly simplified the complicated railway layout by the abandonment of duplicate routes. And the process is by no means yet complete, for further simplification, accompanied by substantial savings, is still to be realised.

Removal of the viaduct and girder bridges leading to Court House, with the release of some of the

ing to Court House, with the release of some of the goods depot area, as mentioned above, will enable a considerable planning improvement to take place in Barnsley and should give a valuable architectural opportunity for enlivening the appearance of the town during the next few years. Moreover, this opportunity for enrivering the appearance of the town during the next few years. Moreover, this railway rationalisation has achieved not only large economies but greater efficiency, for it has been found that in the process of simplification, economy and efficiency have gone hand in hand.

LORRY-BUS-COACH

C to A Changeover Turned Down

In a written decision, the Metropolitan Licensing Authority has virtually turned down a proposal by Harris Lebus, Limited, the Tottenham furniture manufacturer, to transfer its C-licensed fleet to the A-licence of Merchandise Transport, Limited, its wholly-owned subsidiary. Harris Lebus sought so to transfer 71 C-licensed vehicles and 48 on C-hiring allowances. Merchandise Transport applied to add 78 vehicles on A-licence and 48 on A-hiring allowance. The licensing authority (Mr. D. I. R. Muir) has authorised only seven articulated vehicles in a special category to be transferred. The principal object of this application, also two others, to transfer to Merchandise Transport 38 A-vehicles and two B-vehicles operated by C. E. Dormer (Leyton), Limited, and C. E. Dormer (Islington), Limited, was said to be to form a single integrated fleet of A-licensed vehicles primarily to serve the extensive transport needs of Harris Lebus. It was claimed that there would then be a simplification of record keeping, ability to interchange drivers, and general economy on overheads. It was not denied that there would be a considerably increased opportunity to carry return loads and that there might be a certain amount of abstraction from existing hauliers.

Return Load Capacity

Return Load Capacity

Return Load Capacity

The licensing authority has decided, however, that the main desire was for Harris Lebus and its subsidiaries substantially to increase their capacity for return loads, but the objectors satisfied him that a surplus of vehicles already existed for that purpose or would be created, or that there would be abstraction if the application was granted. For the applicant, Mr. C. R. Beddington maintained that it was not bound to establish need for return loads and that the licensing authority ought not to give any weight to objections which sought merely to prove that excess facilities would be created. He based his submission on three recent decisions of the Transport Tribunal, which have to a large extent prompted the present application. Mr. Muir says he finds nothing in them which would lend support to the contention that an A-licensee has a kind of prescriptive right to carry return loads irrespective of the effects this may have on other hauliers. There is nothing to debar objectors from demonstrating that excess facilities would arise. If the application were granted it would be the precursor of others. In the 1933 Act, Parliament decided that it would be in the public interest that hauliers should be protected against the inroads of private traders with spare capacity. Difficulties would obviously arise if A-licensees decided always to object to return loading but in the past there was a general if tacit agreement that it would be in nobody's interest to raise them. But it would be wrong to suppose that because the statutory right to object had not been exercised in such cases that it was for that reason non-existent.

that it was for that reason non-existent.

Decision on the applications to transfer the vehicles of the Dormer companies (controlled by Merchandise Transport) is deferred. The licensing authority finds that the object of these takeovers was to add to the Harris Lebus fleet 38 A-vehicles which without further proof of need could be used for furniture outwards and general goods on return.

year and that six million people will use the station. These premises, designed by Mr. Alan A. Briggs, the Tilling group architect, are a distinct asset to the town and fit in well with the adjacent modernised shopping centre around Crewe Square and Royal Arcade. The company will reap a reward by economising on dead mileage.

Edinburgh Protection Whittled Away

ONE of the consequences of the last increase in fares authorised on Edinburgh Corporation services has been that fares on Scottish Omnibuses routes within the city boundary have also been increased but more travellers in the city can use the latter services without extra cost. The new fares structure, which introduced a charge of 3d. for two stages instead of the former three stages, raised the maximum fare to 10d. There is a protection agreement, made in 1954, between the Corporation and Scottish Omnibuses which presents the latter charging the same fare up to 5d. vents the latter charging the same fare up to 5d.



A 1946 Leyland Titan of Eastern National, one of the numerous open-toppers in the Tilling group which are available as grandstands at race meetings; right, vertical-engined Guy 44-seat coach with unusual window and roof treatment seen in Rotterdam

capacity is a very low 63 for a 30 ft, long double-deck vehicle, 31 on the upper deck and 32 on the lower. Both saloons are finished in decorative laminated plastics and the lighting is by means of fluorescent tubes in a transistorised circuit.

Bus Station for Crewe

LONG mooted, the scheme for a bus station in Crewe came to fruition this week, when on Tuesday the Mayor of Crewe, Councillor S. Orwell, cut a tape across the entrance of the premises erected by Crosville Motor Services, Limited. Public service from the station, instead of from a scattered service from the station, instead of from a scattered group of terminal stances up to 350 yards apart, began on June 22. Town services will work in and out of a group of platforms at the Charles Street end and will run through; country services, including those operated by North Western Road Car Co., Limited, and Potteries Motor Traction Co., Limited, will operate from 14 bays served by a covered waiting area and backed by the company's divisional offices, inquiry and tours office, a cafe and bookstall; there are also car and cycle parks. Excellent staff accommodation is provided. There is a garage and an engineering bay with pits on the site and a separate approach through a fuelling bay and a washing machine is available from Delamere Street. There are 54 Crosville buses attached to Crewe depot which will be garaged in the station at night, mostly under cover; it is estimated there will be 300,000 departures each

The effect of the new fare scale is that passengers travelling for a minimum of five stages will be able to use either service at the same fare. The points at which the same fare could be charged have been drawing closer and closer to the city with each fares increase, and Scottish Omnibuses is attracting more custom for short journeys because of its rather faster services as a result of fewer stops. Either party to the agreement, which runs for 10 years, can seek discussion of amendments at three months' notice.

Maintenance Vehicles Granted

SIX additional vehicles on A-licence for main-SIX additional vehicles on A-licence for maintenance purposes were sought by Allison's Transport (Contracts) Limited, Dundee, before the deputy Scottish Area Licensing Authority. Mr. Gilbert Taylor, joint managing director, in evidence, said that each vehicle of his fleet was off for seven working days a year for purely running maintenance. In addition each vehicle was off for three days a year for its first dock after 50,000-fle0,000 miles, and for approximately 21 days for its second dock (110,000-120,000 miles). Over a two-year period there was a minimum 19 days per annum that each vehicle was off the road. Vehicles were also off for painting every two years, and they were also off for painting every two years, and they had to take into account accidents, which they could not forecast. During last year up to April they had lost 104 working days through accidents. Previously they had had to resort to regulation 15

for the replacement of vehicles taken off for over-

for the replacement of vehicles taken off for overhaul or repair, but this procedure had now become rather irksome.

Mr. D. Brown, for British Railways, suggested that the history of Allison's A-licensed fleet was one of comparatively recent development from special A-vehicles, which had no claim to an allowance for maintenance vehicles. To this Mr. W. D. Connochie, for the applicant, replied that Allison's, having been granted A-licences in substitution for special A-licences, was now entitled to come forward and ask for maintenance facilities. The generally accepted yardstick had been one maintenance vehicle for every 10 in the fleet. Mr. Alex. Robertson granted an A-licence for one eightwheeler of 7½ tons, and four articulated units.

Hidden Brake Cable Defect Forgiven

A SUMMONS brought against the Mobil Oil Co., A SUMMONS brought against the Mobil Oil Co., Limited, for using one of its road tank lorries with an inefficient braking system was dismissed by Nottingham magistrates last week after the solicitor for the company, Mr. A. Rothera, had said that last year £923 had been spent on the vehicle in normal maintenance. The summons was brought after the handbrake cable snapped while the tanker was delivering petrol at a garage in Nottingham. It ran out of control down a slope across the road and then ran forward again into the front of a cinema. Mr. Peter Danks, prosecuting, said it was his case that the cable snapped because of lack of proper maintenance. A Ministry of Transport vehicle examiner said the cable had been frayed inside the protective sleeve. The fault would not have been easy to detect, but it would have been possible to find it had the brake cable been removed for examination.

possible to find it had the brake cable been removed for examination.

Mr. Harold Milson, a Scunthorpe garage foreman, said that on the day of the accident he had road tested the tanker after its monthly service by his firm. He was quite satisfied that the brakes were in proper order. He said he would have been able to tell by the movement of the handbrake lever if the cable had become frayed as there would have been hinding within the protective sleeve. have been binding within the protective sleeve. Mr. R. Quatermass, northern transport engineer for the owners, said that money was no object so for the owners, said that money was no object so far as his company was concerned in ensuring efficient maintenance. The vehicles had regular monthly, three-monthly, six-monthly, yearly and two-yearly maintenance schedules. He submitted that the handbrake cable snapped because of an unreasonable strain on it and not because of bad maintenance.

Bus and Coach Developments

C. J. Elms and Goach Developments

C. J. Elms and Sons, Limited, Tottenham, applies for the licences of Thomas Gibson (Lily Coaches), of Lower Edmonton.

E. Maguire, Carrigallen, introduced a new Tuesday, Friday and Sunday service between Gowna and Bundoran on June 3. It operates via Arva, Carrigallen, Ballinamore, Derrynacreeve, Lattone, Blacklion Cross, Kiltyclogher and Kinlough. On Sundays a second vehicle works from Aughavas to Bundoran via Mohill, Gorvagh and Fenagh to Ballinamore and thence as the other service

Creams (Llandudno), Limited, Portmadoc, seeks the excursions and tours from Llandudno of J. R. Bithell.

Keighley-West Yorkshire Services, Limited, proposes two new Keighley town services—from Utley to Bracken Bank Avenue and from Spring Bank to Oakworth. The Stockbridge—Bracken Bank Avenue service would be modified if the foregoing are granted.

anted.

Halifax proposes to add \{d. to its fare stages, 2d, to 3\{d. and \}d. to each rate thereafter. Halifax proposes to add 4d, to its bare soages, id to each rate thereafter.

Rotherham seeks permission for 1d, to be added to all adult fares from 2d, to 8d, not affected by the previous increase of May, 1957.

Charles Davies and Sons, Talgarth, wishes to drop the Penyrheolinon—Pencaemelin portion of the Penyrheolinon—Brecon service and to incorporate the remainder in the Llaneglwys and Brecon service.



AGAIN Albion **ORDER** BORG & BECK FRICTION **CLUTCHES**

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FRICTION CLUTCHES/TRANSMISSION SYSTEMS

PROVING GROUND FACILITIES

Their Use In Commercial Vehicle Development*

WITH the increasing tendency for speeds to be raised the handling characteristics of vehicles of all sizes have become increasingly important. These characteristics may be examined to a certain extent on the steering pad facility—a flat concrete area having a central post with a horizontal line around it at a given height. At specified distances from the post circles are marked on the ground, so that a vehicle may be driven at a specific radius.

It is evident that if steady speed conditions are reached with a set steering wheel position the effect of increasing or reducing speed will immediately indicate whether the vehicle shows understeer or oversteer characteristics. In addition, very many other tests may be made on the steering pad to determine the steering angles, roll angles and so on at various radial accelerations.

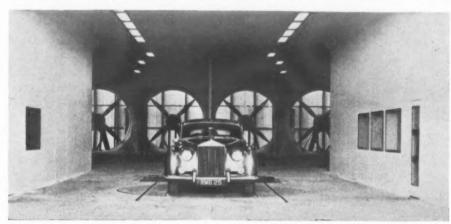
During the development of a commercial vehicle it is often desirable to drive it at a given steady speed, which is frequently impossible on a public highway. This requirement has been met by the provision of a banked track which allows the fastest commercial vehicle speeds to be maintained with ease for as long as required. The life of tyres and

WITH the increasing tendency for speeds to be raised the handling characteristics of vehicles of all sizes have become increasingly important. These characteristics may be examined to a certain extent on the steering pad facility—a flat concrete area having a central post with a horizontal line around it at a given height. At specified distances from the post circles are marked on the ground, so that a vehicle may be driven at a specific radius.

It is evident that if steady speed conditions are reached with a set steering wheel position the effect of increasing or reducing speed will immediately indicate whether the vehicle shows understeer or to provide fully automatic transmission. With this arrangement it will be possible to feed into the electrical resistance circuit changes which could be made to correspond to a known operational route. In this way, for instance, the variations in gradient when driving over a particular section of terrain could be imposed on the test vehicle.

Ride and Handling Course

The test facilities already described cover the majority of those required in assessing the per-formance of a commercial vehicle under conditions



The working area of the M.I.R.A. wind tunnel, which can accommodate the largest The working area of the M.I.R.A. wind tunnel, which can accommodate the largest goods and passenger vehicles, incorporates a power absorbing dynamometer for up to 250 h.p. and underfloor balances to measure air loads on the vehicle under test at speeds up to 80 m.p.h.

other components and also operating temperatures and pressures can be recorded, together with fuel and lubricant consumption. Brake fade and vehicle acceleration tests also require a smooth, level road surface away from public highways.

Simulating Long Gradients

One of the test facilities which we lack in Great Britain is extended steep gradients similar to those encountered in many parts of the world. However, this need has been met in two ways. There is provision of short lengths of gradients of 1 in 3 and 1 in 4, which allows vehicle handbrakes to be tested on either of these two gradients, and also the ability of a vehicle to be restarted to be determined. A second facility, which reproduces the effect of varying gradients, is a dynamometer trailer.

The trailer design is based on a six-by-four heavy vehicle which carries at its forward end a special drawbar. This is adjustable for height and the pull on the dynamometer trailer is measured by wire resistance strain gauges mounted on two concentric cylinders in the coupling. One cylinder is loaded in tension and the other in compression. Special provision is made in the drawbar coupling design to resist bending forces and to ensure that the strain gauges read only the results of direct tension. Resistance to traction is obtained through tension. Resistance to traction is obtained through the bogie wheels, the normal transmission line and 12-speed gearbox, a power take-off with chain drives to two generators and four large electrical

Up To 250 h.p.

When the trailer is being towed the normal vehicle clutch is kept permanently disengaged and the power-take-off drive is brought into operation the power-take-off drive is brought into operation from the rear wheels acting through the main and auxiliary gearboxes. Each generator is capable of absorbing between 100 and 125 h.p. A small auxiliary diesel engine is used to drive an ancillary generator, the current from which supplies the field windings of the two main generators. Additional ballast is provided to prevent skidding of the bogie wheels under heavy drawbar pulls. Instrumentation, including a direct reading of the drawbar pull in tons, is provided in the cab of

* The first part of Mr. G. K. Martlew's paper to F.I.S.I.T.A. appeared last week.

anywhere in the world. However, it has been

anywhere in the world. However, it has been found that certain adverse features concerning the way in which a vehicle handles may escape notice during development. To meet this limitation, further test facilities in the form of a ride and handling course are being considered.

The use of the test facilities described has improved the performance of commercial vehicles in service all over the world. In the author's experience, the biggest single improvement has resulted from extensive use of the pavé test track. The improvements in the riding qualities of vehicles developed in this manner have extended the periods between major overhauls many times. Records developed in this manner have extended the periods between major overhauls many times. Records show the relative importance of various design features under a given type of operation and they have also stressed how climate and terrain modify the general picture. In this way it has become possible to predict, by the use of certain test facilities, how a vehicle will perform in any particu-lar part of the world.

Of Immense Benefit

Of Immense Benefit

The postwar development in the use of proving ground test facilities has been shown to be of immense benefit. Many special techniques have been introduced as the causes of different commercial vehicle faults have been determined. Critical analyses of the weaknesses shown have enabled them to be cured in the minimum of time and with the least expense. Each of the test facilities described has been shown to have importance in the reproduction of service faults and racinties described has been shown to have impor-tance in the reproduction of service faults and their subsequent prevention. The permanent nature of many of the facilities is advantageous and the ability to repeat previous results is often of great value. This ensures that a true assessment of the progress resulting from design changes may be made.

As the qualities of commercial vehicles are As the qualities of commercial vehicles are improved and their use is further extended, the need for additional test facilities becomes evident. Thus, 10 years ago the only special tests available to the whole of the British commercial vehicle industry were a triangular airfield perimeter track, half-mile stretches of pavé and corrugated track and a shallow water splash. It is probable that in the next 10 years many further facilities will become desirable in order to ensure that British commercial vehicles continue to be suitable for world markets.

The M.I.R.A. Wind Tunnels

INVESTIGATION OF AERODYNAMIC EFFECTS

INCREASING speeds of modern vehicles give rise to the question of drag and of the access of air to the brakes for cooling purposes. They also raise the question of the effect of winds striking also raise the question of the effect of winds striking the vehicle at various angles on stability, and thus controllability. Even if maximum speeds were to remain moderate, such problems would not lose their significance. Drag, for example, which is the aerodynamic force opposing straight-ahead motion of the vehicle, will always be of interest for its effect on fuel economy; if body shapes were to alter, with the object of reducing drag or in accordance with styling changes, this might affect the cooling of the brakes, so that a compromise has to be found.

In addition, there are several problems with an aerodynamic aspect which must recur from time

aerodynamic aspect which must recur from time to time as new designs are produced. These relate to the flow of air for cooling the engine or transmission; the flow of air to the engine induction system, which affects power or the possible entrainment of dust; the flow of air for ventilating or air conditioning the passenger compartment; possible extractor effects of air currents on the exhaust system; the impingement of dust, mud, insects and so on, on the outside of the vehicle; and the intensity of wind noises as influenced by

body shape or fittings. From these examples it will

body shape or fittings. From these examples it will be seen that the aerodynamic characteristics of the vehicle can affect its safety, running economy, durability and comfort; there are no generalised solutions that can be applied to these problems as they arise in evolving new designs, so that continued experimental work is necessary.

In order to decide what equipment would be desirable for carrying out aerodynamic investigations, M.I.R.A. has done exploratory tests on full-sized cars in the 24-ft. wind tunnel of the Royal Aircraft Establishment, and on scale models in the 5 ft. by 4 ft. wind tunnel of Sir W. G. Armstrong Whitworth Aircraft, Limited, and in the 8 ft. by 6 ft. tunnel of the College of Aeronautics. Three full-sized cars and their corresponding models were used in these tests, while a comparison was also obtained in the case of the full-sized cars of drag coefficients measured in the wind tunnel and on the road.

Road tests were limited to the measurement of drag, but the wind tunnel tests covered, in addition to drag, lift and side forces and the rolling, yawing and pitching moments, all these quantities being measured both in relation to a head wind and at different angles of yaw to simulate cross-wind (Continued on page 21)

PLAYER'S please... and so do COMMER



HE SUCCESS of these new Commers is truly sensational. Transport operators all over the country enthusiastically confirm the opinion of the press that in looks, in loadspace, in economy and swift manoeuvrability the Commer 2 ton range of Goods and Passenger Vehicles is unrivalled in its class today.

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George Mortimer Pullman

NE definition of a great man is someone responsible for great changes, either in theories or practices. George Mortimer Pullman certainly brought about great changes to practices common in his era—changes which influenced the appearance of railway coaches in many lands and which today are synonymous with his name. For he has the distinction of having given his surname to the Oxford English Dictionary as did Diesel of engine fame, Hansom of the cab, and Lord Brougham of the carriage. This recognition was achieved as a result of his simple and straightforward outlook, for as a man of action he was always consciously

aiming at one goal.

But when Emily Caroline and James Lewes Pullman celebrated the birth of their third child on March 3, 1831, at Brocton, Massachusetts, U.S.A., the Steam Age was just dawning, heralding an era of mechanical motion and ending the period lasting from the beginning of history when man had been able to move over the solid surface of the earth only through the agency of his own limbs or those of an

animal.

Although James Pullman had a fairly good job as a general mechanic, the family was compelled to watch expenditure and luxuries were few and far between. Young George helped with the house-third compensation of the weaking cutting far between. Young George helped with the house-hold chores by hanging out the washing, cutting firewood, and washing the dishes. In addition, he helped to supplement the family diet by cultivating a garden and it was not long before he could distinguish the difference and qualities of the many species of tree which were then to be found in the woods of Western New York. This knowledge was to prove particularly useful in the years ahead, although at the time he was unaware of it.

In comparison with today's standards the more formal education given to young George Pullman was meagre. Apart from the basic rudiments of the

GEORGE MORTIMER PULLMAN

By Ivan E. Broadhead

I-PULLMAN THE MAN

three Rs—reading, writing and 'rithmetic—other knowledge had to be gained from his father. Despite his sparse education, intuition made him sense there were better things in life and at the age of 14 Pullman resolved to break away from his

of 14 Pullman resolved to break away from his family and find a job.

Shortly afterwards he obtained employment as a clerk in a supply store at Westfield, New York, and in return for his efforts received the prodigious salary of forty dollars a year. Nevertheless at first he was contented. But after three years of selling merchandise he once again felt restless and decided to move.

At the nearby village of Albion, Pullman had a At the hearby village of Abboth, Ptahian has a brother who was in business as a cabinet maker. Packing his possessions once again, George moved there and became a partner in the business. Here he was to find useful the knowledge of timber he had acquired during his wanderings in the woods several years earlier. In Albion too lived Ben Field, a close friend who was to play a large part in future enterprises.

Quality

Quality

The Pullman brothers sought to produce and maintain a high standard of quality and George repeatedly expressed their policy as being the production of cabinets better than those of any other manufacturer in the trade. The business prospered and he found generally his customers were "willing to pay for the best provided they got the worth of their money." He turned this theory into a philosophy of life and his every act from that time on was governed by it. Financial return never worried him, for he reasoned that if the product was the very best, cash dividends would follow automatically. Here at Albion he found a wider field for his natural abilities and at the same time served an apprenticeship in woodworking and construction which was soon to be the foundation for much larger projects.

During his stay at Albion, Pullman had the occasion to make an overnight journey in a sleeping car from Buffalo to Westfield, a distance of 58 miles. While trying to sleep, he later said: "I was thinking how the car might be improved." As an enterprising cabinet maker Pullman wondered why it had not been found possible to build cars with comfortable beds. Here was an idea worth exploring! The car was not only uncomfortable but extremely cold. Although each bunk was provided with a hard mattress, there were no blankets. At one end of the vehicle a wood burning stove was unsuccessful in raising the temperature above freezing point, whilst the flickering light of a few candles was the only source of illumination. As Pullman lay awake he began to think how these conditions could be improved on, but without capital his ideas had to remain—just ideas. When eventually he got back to Albion, he did however discuss them with his friend Ben Field before filing them in his mind for use whenever opportunity presented itself. But there were other worlds to concurs before Pullman applied his talents to them in his mind for use whenever opportunity presented itself. But there were other worlds to conquer before Pullman applied his talents to revolutionising the nations' sleeping car business. In 1852 Pullman's father died, leaving his widow

with four children to rear. George helped his mother financially but the income from cabinet making was no longer sufficient and a decline in trade encouraged him to seek alternative employment. The State of New York had just announced plans to widen the Erie Canal which was an important waterway at that time and spurred on by his needs, Pullman saw this vast engineering project as a new challenge to his ability and one from which he might profit by offering to assist. The gigantic operation required the moving of many buildings and warehouses which flanked the canal. There were none of the mechanical marvels we know today and contractors were few in number; this meant the volume of work far exceeded their combined capacity. With boldness as his ally Pullman tendered for a contract to take part in the scheme. The work had to be done, and done quickly. The State was desperate. It made little or no difference as to the bidder's experience or qualifications and without more ado Pullman was allocated a contract to cope with the buildings allongist the canal where it passed through Albion allocated a contract to cope with the buildings alongside the canal where it passed through Albion.

Despite his lack of training the venture proved successful and he made a profit of some 6,000 dellars.

6,000 dollars.

Having established his ability to cope with such Having established his ability to cope with such tasks he sought additional work of a similar nature. Westward the City of Chicago suffered from a lack of proper drainage and seemed to be a possible source of work, so to Chicago went George Pullman. When he arrived there in 1853, Pullman was only 24 years of age; the city itself was even younger, but was growing at a remarkable rate. Anxious to be in a strategic position and to impress business associates he booked accommodation at Tremont House, Chicago's four-storey skyscraper of that House, Chicago's four-storey skyscraper of that era. Word soon reached him that the hotel proprietors wished to raise the structure and considered that the only way to do so was to demolish the building and rebuild it brick by brick. You could not move so big a brick building they argued.

Moving an Hotel

Moving an Hotel

Pullman's work at Albion had yielded many ideas and he now determined to apply his experience. He introduced himself to Irma and James Couch who controlled Tremont House, and explained that he, George Pullman, could move the hotel, colossal though it was. And this he would do without breaking a pane of glass or spilling the froth off one glass of beer. His audacity and confidence knew no bounds but the proprietors were sceptical. Reluctantly they gave him authority to go ahead. He did. Wasting no time, Pullman assembled within a few hours a force of some 1,200 workmen and equipped them with 5,000 jacks. Men and jacks were positioned in the basement of the building and at a given signal each man gave four jacks a half turn.

As if it were floating on a cloud the building slowly and gently went up inch by inch, until at last it reached the desired level. So gradual was the elevation in fact that the normal business of the hotel was carried on uninterrupted and it is reported that "not a chambermaid blinked an eye

FOREWORD by F. D. M. HARDING, O.B.E., Managing Director, The Pullman Car Co., Limited

AM very glad of the opportunity to contribute this foreword to Mr. Broadhead's authentic and informative biography of George Mortimer Pullman, as I have long felt that the astonishing story of this remarkable man and his achievements in the railway sphere should be recorded for posterity.

The resounding success Pullman achieved is all the more surprising because his vision and energies were devoted to an industry which was entirely foreign to him except from the passengers' point of view. As a traveller dissatisfied with conditions as he found them, he translated his dissatisfaction into constructive action and despite many obstacles eventually succeeded in providing luxurious railway travel, in so doing achieving fame and considerable wealth.

His belief that the public would pay for quality has been tested and proved correct. Today, the Pullman Car Co., Limited, in Great Britain continues to uphold the tradition of providing the highest possible standard, set so many years ago by our

possible standard, set so many years ago by our distinguished founder.

In presenting the fruits of his researches, Mr. Broadhead has produced a fascinating and inspiring narrative about a hitherto unrecorded facet of railway history. I commend this book as one of wide public interest and also as a source of personal inspiration to everyone in the railway industry. inspiration to everyone in the railway industry

F. D. M. HARDING

or dropped any crockery." The total cost of lifting the structure the required four feet amounted to 45,000 dollars and newspapers of the day praised it as a great feat. Scarcely had George shaken the mud of upstate New York off his shoes before had become a noted and respected citizen of the thriving metropolis. His success was quickly reflected by abundant offers to undertake similar work. He accepted them all and did them to the best of his ability, profiting accordingly. best of his ability, profiting accordingly

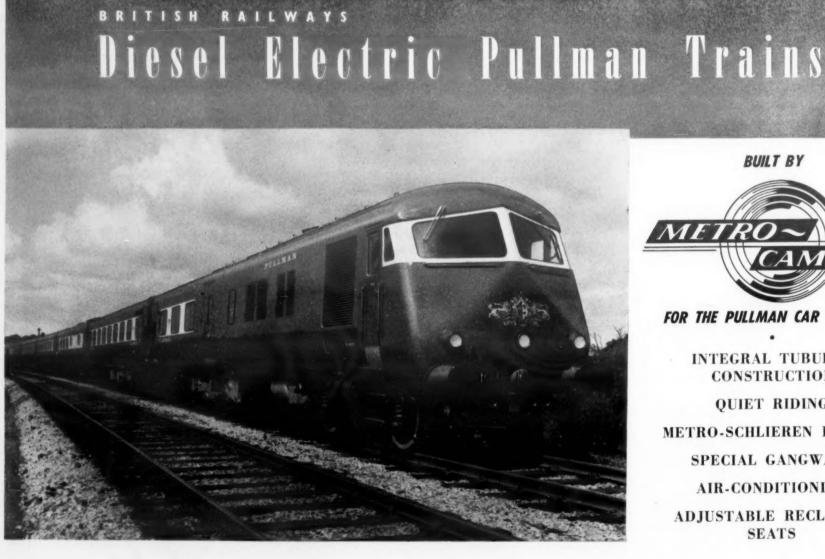
Sleeping Car Problem

Sleeping Car Problem

Inspired by the ruthless expansion of industrial empires in Chicago, Pullman decided the time was opportune to tackle the sleeping car problem. Before undertaking the project and investing his hard-earned capital however, he wisely concluded that he should study the history of rail transport and in particular familiarise himself with the evolution of sleeping cars.

In reading many texts on the subject he found that scarcely before there was an American railroad long enough to require travel at night, inventors were evolving a sleeping car. What was probably the original sleeping car design was exhibited in Fanueil Hall at Boston as early as 1829 by Mr. R. F. Morgan. It was called the Morgan Railroad Carriage and is said to have been "a fearful thing to behold," being so large that one reporter called it a land barge. This description was probably encouraged by the fact that there was a "captain's office" at one end and a raised cupola surmounted by the American flag at the other. The vehicle was a double-decker with five "births" (official description which appears to have gone uncorrected) and above these a promenade deck protected by a canvas awning. It was never patented or used.

Seven years elapsed before any further serious attempt was made to cater for passengers at night. In the wake of the rapidly developing railroads came increasing competition and persistent (Continued on page 21)



BUILT BY



FOR THE PULLMAN CAR CO. LTD.

INTEGRAL TUBULAR CONSTRUCTION QUIET RIDING **METRO-SCHLIEREN BOGIES** SPECIAL GANGWAYS AIR-CONDITIONING ADJUSTABLE RECLINING SEATS

Metropolitan-Cammell Carriage & Wagon · Co · Ltd ·

SELF-CONTAINED DIESEL PULLMAN TRAINS

Personal Service at All Seats

AIR-CONDITIONED AND INSULATED SALOONS

TWO of the first of British Railways' new de luxe diesel-electric Pullman trains were demonstrated this week between Marylebone and High Wycombe. These 90 m.p.h. de luxe diesel-electric sets—there are five of them altogether—are of an entirely new type designed to bring a fresh conception of main line railway passenger travel to Britain, with superior standards of comfort, and a personal service of meals and refreshments for all passengers.

Notable Design

These remarkable de luxe trains have been designed and built by Metropolitan-Cammell Carriage and Wagon Co., Limited, to the requirements of the British Transport Commission, under the general direction of the chief mechanical engineer, in collaboration with the chief electrical engineer and chief traffic officer, respectively, of British Railways Central Staff, B.T.C., and the Pullman Car Company. The chief mechanical and electrical engineer, Lon-don Midland Region, was responsible for inspection during construction and for test inspection during construction and for test running. The traction equipment was supplied by the General Electric Co., Limited; the diesel engines are of N.B.L.-M.A.N. type by the North British Locomotive Co., Limited, air-condition-ing and lighting by J. Stone and Co., Limited, auxiliary engines by Rolls-Royce and electro-magnetic braking equipment by Westinghouse.

Aesthetics and Decor

Special importance has been given to the amenity and aesthetic design of these trains, including both external and internal appearance, decor and passenger comfort, by Metropolitan-Cammell, in consultation with Mr. Jack Howe, F.R.I.B.A., F.S.I.A., who has been the design consultant for the project throughout, and was appointed with the approval of the British Transport Commission's design panel and the Pullman Car Company

Two of the trains are of six cars for first-class bassengers only, and three are of eight cars with first- and second-class accommodation. The six-



Imposing front end view of the Midland Pullman

of the windowed section along the sides of each car. The rounded nose of each of the motor cars bears the Pullman Car Company's crest, which is also carried on the white painted band, midway between the last pair of windows at the end of each vehicle. Beneath each of these crests and just below window level on the blue bodyside is the word "Pullman," lettered in white. The roofs are painted light grey, the underside aluminium and the bogies black.

Smooth and Silent

Travel in these Pullman trains is designed to be smooth, comfortable, and almost silent, even at high speeds. They are the first trains in Britain to

tables. A further refinement in the first-class cars is that each seat can be adjusted from reclining to upright positions. The seats in the second-class saloons are similar but are fixed.

Striking Decor

The interior decor varies from vehicle to vehicle, and has been carefully chosen to give pleasing and colourful combinations, mainly of decorative rosewood and ebony veneers, grey plastic hide, plastic facings, and contrasting seat upholstery in red or blue striped fabric, trimmed with black and grey plastic hide. The partitions forming the ends of each passenger saloon are strikingly decorated with each passenger saloon are strikingly decorated with wood veneers and abstract plastic inlays.

class. The heater grilles, mounted low on the bodyside alongside the seats, are of satin-finished stainless steel.

Fluorescent Lighting

Fluorescent Lighting

Warm white fluorescent lighting, concealed by opal diffuser panels, is the principal form of illumination throughout the passenger accommodation, supplemented by individual table lamps. In each saloon the main fluorescent lighting is by twin tubes placed end to end along the centre of the ceiling, covered by diffusion panels which, when illuminated, give an impression of a continuous panel of light running the length of the saloon. The inward flow of air from the air-conditioning plant in each vehicle is dispersed through ducts and outlets which are above and are concealed by the central lighting panel.

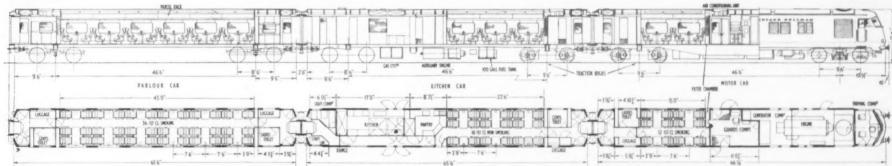
Additional illumination is provided by tungsten lamps fitted in the luggage racks above each table. The individual table lamps have glass shades, and are mounted on swan-necked pillars fixed to the bodyside just below window level, leaving the French grey plastic covered table tops free from encumbrance of lamp standards or trailing wires. Small battery-operated emergency lights are also installed.

New Type Gangways New Type Gangways

The entrance vestibules at the end of the cars are wide and spacious, and the walls are faced in pearl grey plastic, with plastic hide trimming around the entrances to the air-tight and draught-proof passenger access gangways between vehicles. These are of an entirely new design and are far wider than usual. They are mounted upon pivots at the ends of each vehicle and, when joined together, form semi-floating units between pairs of cars, providing a level platform free from the oscillation associated with ordinary gangways. Rubber seals cover the outsides of the gangways and prevent draughts and loss of efficiency in the air-conditioning of the train. Immediately adjacent to the vestibules and to one side of the entrance to the passenger saloons are the toilets, and, on the the passenger saloons are the toilets, and, on the other, there are enclosed compartments for heavy luggage

Hygienic Toilets and Kitchens

The toilets are equipped to include such features as towel dispensers, and hygienic spray washing facilities which give an automatically timed flow of



The layout of three cars of the all-first-class Pullman diesel-electric set for Midland line services

LEADING DIMENSIONS

409 ft. 1 in. 545 ft. 1 in. 66 ft. 5½ in. 65 ft. 6 in. 12 ft. 4½ in.

car trains will run between Manchester and London St. Pancras, and between London and Leicester; the eight-car trains will operate between Bristol and London Paddington, and between Bristol and London Paddington, and between Wolverhampton, Birmingham and Paddington. The Manchester — London — Leicester services will be introduced on Mon-day, July 4, and the other services will start shortly afterwards

Each six-car train consists of two motor cars which are the leading vehicles at each end; these house the two main diesel engines and electric

ngth of train (over buffers)—six-car ngth of train (over buffers)—eight-car agth of vehicles (over body)—motor c. agth of vehicles (over body)—other ca-ight from rail level to roof level dth (at waist) tance between bogie centres 9 ft. 46 ft. 6 in. be fully air-conditioned with controlled tempera ture and humidity, and particular care has been given in their design to the reduction of noise. The passenger accommodation is in enclosed saloons,

the vehicles are heavily insulated against sound and

access door in each partition has glazed panels, incorporating glass with a vertical striped pattern which has the property of a mirror but allows unim-peded vision at close quarters.

The bodyside walls of the vehicles are surfaced

Distance between axle centres—motor and leading bogies

Distance between axle centres—trailing bogies

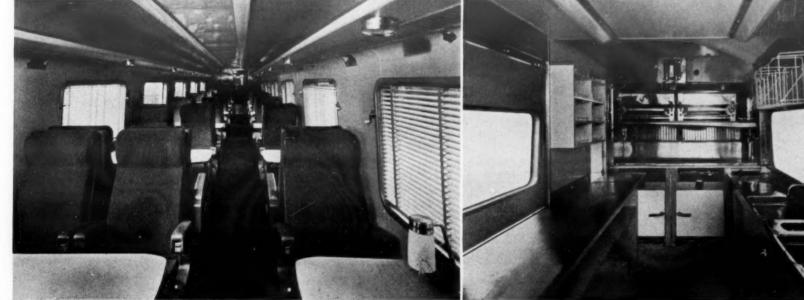
Maximum service speed
Weight of train in working order—six-car.
Weight of train in working order—eight-car

9 ft. 6 in 8 ft. 6 in

90 m.p.h. 299 tons

The temperature of the washing water can water. The temperature of the washing water can be selected to suit individual needs and is automatically maintained until the timed flow ceases. The toilet floors are paved in coloured mosaic with easy-to-clean hygienic skirtings; the ceilings are painted matt white, and the walls are faced with plastic surfaces in flame, clover pink and grey. All the metal fittings are finished in satin chromium plate, with the exception of the skirting beadings of satin finished anodised aluminium and the similarly finished stainless steel heater and ventilation grilles.

In the kitchen cars the kitchen and separate pantry accommodation has been designed with particular attention to hygiene and proper storage



Interior view of first-class parlour car in one of the new Metropolitan-Cammell diesel-electric Pullman sets, and, right, a kitchen

generators, driving compartments, and saloons for passengers; there are two kitchen cars which lude non-smoking saloons for 18 passengers; and metude non-smoking sations for 18 passengers, and two parlour cars each seating 36 passengers. The total accommodation of the six-car train will be for 132 first-class passengers. The eight-car trains have additional seating in the motor cars and in two more parlour cars for second-class passengers, giving a total capacity of 108 first-class and 120 second-class seats. All seats on the delive Pullman econd-class seats. All seats on the de-luxe Pullman

trains will be reserved.

The trains are painted Nanking blue, relieved by a broad white band extending the length and width heat, and the windows are double glazed. They have fully adjustable venetian blinds between the glasses. The floors of the vehicles also are fully uspended and insulated as well as being covered ith underlays and carpets.

In each car the seating is arranged in facing pairs

on one side of the passenger gangway and in facing individual seats on the other, with double or single fixed tables respectively set between them. The armchair-type seats in the first-class saloons are deeply padded with foam rubber, and are mounted individually on runners with a locking device, so that they may be set nearer or farther from the

with plastic hide from floor level up to and including part of the continuous hand luggage rack running the length of each passenger saloon. Above the racks, walls and ceiling surfaces are lined with plastic facings in pearl grey, with a fine black-line pattern superimposed which continues up to the code of the continuous central lighting panel in edge of the continuous central lighting panel in the ceiling. The floors are carpeted in kingfisher blue or cardinal red, laid on plastic underlays. The exposed parts of the hand-luggage racks, the table edges, and window surrounds, are all of anodised aluminium, satin finished in aluminium for the first-class cars, and in pale gold for the second-

of food and drink. The walls are lined with an easy clean plastic finish in pearl grey, the ceilings are matt white, and the floors are of red composition material set in aluminium grilles with a 2-in. square mesh. Four extractor fans are fitted in the square mesh. Four extractor lans are intended in the control of each kitchen space, two of them immediately above the fume chamber over the gas cooking range with its large grill. All the kitchen utensils and working surfaces and both the sterilising and all-purpose sinks are of stainless steel. Other features include a constant boiling water supply and both deep-freeze and normal domestic refrigeration.
(Continued on page 8)

Self-Contained Diesel Pullman Trains

(Continued from page 7)

A public address system is installed throughout the train, and the guard and driver are linked by Loudaphone. The train is fitted with air brakes with automatic slack adjustment on each bogie, and provision has been made for automatic warn-ing system equipment to be installed.

Bogies and Drawgear

Bogies and Drawgear

Designed throughout for maximum passenger comfort, the train has Metro-Schlieren type bogies incorporating helical springs and hydraulic dampers. In each of the four driving bogies the two separate electric traction motors are fully suspended, and the transmission from each motor to its respective axle is by a quill drive. The driving bogies are situated at the trailing end of each motor car, and at the leading end of the adjacent vehicle, that is the kitchen cars in the six-car trains and the additional parlour cars in the eight-car units.

A new type of permanent coupling is employed between the cars which absorbs both buffing and drawing loads, and was designed for the de-luxe trains to provide a smooth pick-up at starting and

ted underfloor beneath each of the kitchen cars of the six-car train. In the eight-car trains they are beneath each of the second-class parlour cars, next to the motor cars. One power unit is sufficient for normal lighting and summer cooling or winter heat-

DIESEL-ELECTRIC TRACTION EQUIPMENT

(2) N.B.L.-M.A.N. diesel 12-cylir vee-form 180 mm. bore, 210 r stroke. Type L12V18/21S

Mais -1,700 amp. 383 volts 1,500 r.p.m. 650 kW 1,280 amp. 523 volts 1,500 r.p.m. 680 kW

(2) G.E.C. composite main and aux iliary generators, continuous rat

Auxiliary-91 amp. 110 volts 650/1,500 r.p.m. 10 kV

(8) G.E.C. four-pole, self-ventilating rating 425 amp. 383 volts. 199 h.p., at 1,360 r.p.m. con-tinuous rating. Gear ratio 19 to 67.

A.C. ELECTRIC POWER SUPPLIES (For air conditioning, lighting, refrigeration, and auxiliary ower supply.) (2) Rolls-Royce 190 h.p. at 1,500 r.p.m. horizontal diesel engine. Type C8NFLH. Bore 130.175 mm. Stroke 152.4 mm. Engines (2) Stone Tonum Alternator, Type ARK64L/XR22S 133 kVA, 400 volts, three-phase, 50 cycles Alternator

TANK CAPACITIES

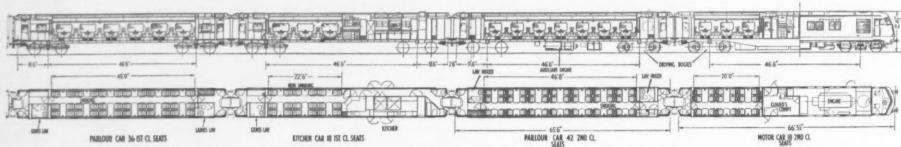
500 gal. (2×250 gal. tanks) 100 gal.

stationary, and static power supply points are being provided at terminal stations on the routes to be served by the trains.

Services to be Operated

Further technical details of these magnificent trains will appear in a subsequent issue of Modern Transport. The services to be operated by the first two all-first-class sets are between Manchester first two all-first-class sets are between Manchester Central and London St. Pancras and between St. Pancras and Leicester. From July 4 the Midland Pullman—for which bookings opened on June 7—will leave Manchester Central Monday to Friday at 8.50 a.m., will pick up passengers at Cheadle Heath at 9.04 a.m. and complete the 189-mile journey to London St. Pancras in 3 hr. 13 min. arriving at 12.03 p.m. In the reverse direction the service will leave London St. Pancras at 6.10 p.m., set down passengers at Cheadle Heath at 9.07 p.m. and arrive at Manchester Central at 9.21 p.m., an overall journey time of 3 hr. 11 min.

While this service, with its winding and mountainous route between Derby and Cheadle Heath, will be booked at something under 60 m.p.h., the



Half an eight-car Pullman diesel-electric set for Western Region services with two classes of accommodation

stable riding at high speed. Normal coupling hooks are fitted in concealed recesses in the nose of each of the leading motor cars of the train for emergency

Power Equipment

Power Equipment

The train is powered by two 1,000 h.p. M.A.N. 12-cylinder vee-type diesel engines supplied by the North British Locomotive Co., Limited, each direct-coupled to a G.E.C. composite main and auxiliary generator. The main generator supplies d.c. current for traction purposes to the eight G.E.C. 199 h.p. motors; the auxiliary provides current for exciting the main generator, and for main-engine starter-battery charging, control circuits, air compressors, oil priming pumps, and driving cab heaters.

Alternating current for lighting, air-condition-

Alternating current for lighting, air-conditioning, refrigeration and auxiliary power, including 24-volt battery charging, is provided by two Rolls-Royce eight-cylinder horizontal diesel engines, each direct coupled to a Stone Tonum alternator, moun-

PRINCIPAL SUB-CONTRACTORS

General Electric Co., Limited
North British Locomotive Co.,
Limited
J. Stone and Co., Limited
Rolls-Royce, Limited
Westinghouse Brake and Signal
Co., Limited
Radiation, Limited
Radiation, Limited
James Stott and Co. (Engineers), Limited
Turyfords, Limited
Turyfords, Limited
Turyfords, Limited
Teans and Son (Yorkshire),
Limited
Etablissements Georges Klein
et Cie
Beckett, Laycock and Watkinson, Limited
S. and J. Stockwell and Co.
(Carpets), Limited
Tomlinsons, Limited
Tomlinsons, Limited
Tomlinsons, Limited
Tomlinsons, Limited Traction equipment N.B.L.-M.A.N. engines Air-conditioning and lighting Auxiliary engines Electro-pneumatic brakes Kitchen floors, laid by ... Toilet commodes and basins Bodyside door castings . . Kitchen door droplights Guard's door droplights Carpets (first-class) ... Carpets (second-class)

Seat cover materials
P.V.C. coverings (first-class)

Plastic panels—saloon ceilings Plastic panels—toilets Interior timber partitions Body shell insulation . . Interior insulation . . Ascot heaters Lavatory mosaic flooring Axleboxes G. D. Peters and Co., Limited Edinburgh Weavers, Limited Hunt and Winterbotham,

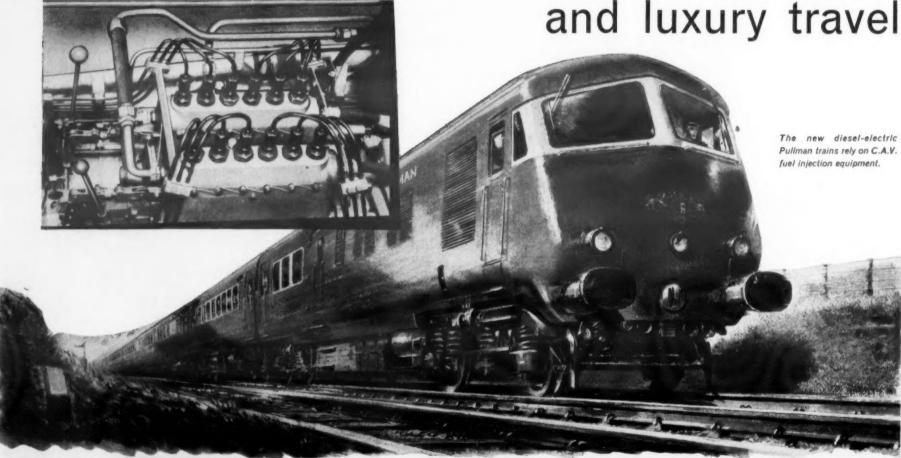
Buffer springs

I.C.I., Limited
Henry Hope and Sons, Limited
Crittall Manufacturing Co.,
Limited
Bakelite, Limited
Holoplast, Limited and Formica, Limited
Edmonton Panel Co., Limited
J. W. Roberts, Limited
W. Gilmour Smith and Co.,
Limited Ascot Gas and Water Heaters, Limited Limited
Carter and Co., Limited
Ciifford and Snell, Limited
Dunlop Rubber Co., Limited
English Steel Springs Corporation, Limited
Skefko Ball Bearing Co.,
Limited
G. Spencer Moulton and Co.,
Limited
Docker Brothers, Limited

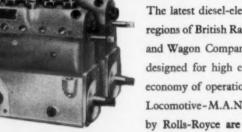
Leicester trips at midday are scheduled at 69.8 and 68.2 m.p.h. respectively. The train will leave St. Pancras at 12.45 p.m., arrive Leicester London Road at 2.10 p.m., depart Leicester at 2.33 p.m. and arrive at St. Pancras at 4 p.m., making 85 and 87 min. respectively for 99 miles. All seats will be reservable on both services, and the Pullman supplements, payable in addition to the first-class fares, will be £1 between Manchester and London and 10s. between Leicester and London.

A new clip-on voltammeter named Miniclip, introduced by Ferranti, Limited, provides three voltage ranges 0-150-300-750 volts and five current ranges 0-4-12-40-120-400 amp. Designed for single-handed operation, measuring 8 in. by $1_{76}^{\rm a}$ in. by $2_{10}^{\rm a}$ in. and weighing less than 21 oz., it incorporates a thumb-operated selector switch for the appropriate scale and is accurate to within plus or minus 3 per cent of full scale on all ranges.

C.A.V. contributes to a new era in efficiency



Twin C.A.V. 6-cylinder fuel injection pumps of this type are used on the N.B.L.-M.A.N. main driving units (L12V18/21S super-



The latest diesel-electric Pullman trains for the Midland and Western regions of British Railways are built by Metropolitan-Cammell Carriage and Wagon Company Ltd., for the Pullman Car Co. Ltd. They are designed for high efficiency, smooth running, passenger comfort and economy of operation. The main diesel driving units of North British Locomotive-M.A.N. manufacture and the diesel auxiliary power units by Rolls-Royce are fitted with C.A.V. fuel injection equipment.



The World's Largest Manufacturers of Fuel Injection Equipment.

C.A.V. LIMITED, ACTON, LONDON, W.3

A.E.C. **ENGINE** DIVISION **EXHIBITION**

Industrial Units

QUITE remarkable strides have been made of recent years in the provision of self-contained power plants for every sort of industrial application. It is commonplace to find stationary industrial equipment powered by its own independent diesel engine or relying upon diesel engines as stand-by equipment in the event of an electricity failure. For all sorts of portable uses, the diesel method has become the standard method of providing mechanical power, generating electricity, or compressing air. In this movement the Associated Commercial Vehicles group has, of course, participated but it remained for an exhibition held at Southall last week to remind users of the wide range of A.E.C. engines available

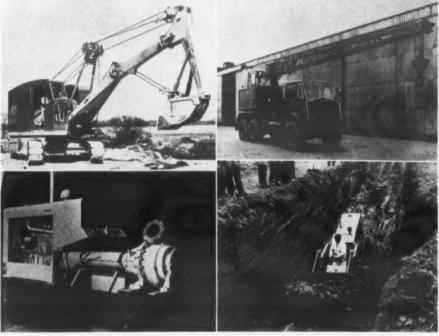


Lord Brabazon of Tara, chairman of the ACV group, touring the A.E.C. engine exhibition at Southall with Mr. J. O. Bowley, general manager of A.E.C., Limited

duces 150 b.h.p. maximum or 110 b.h.p. when serving on continuous duty.

Smallest to Largest

The smallest engines of the range are AV275 and AV312 four-cylinder machines, giving a maximum power of 64 and 75 b.h.p. respectively, with proportionate reductions for continuous duty. Larger engines are the AV590 and 690 in which the avail-



A wide range of A.E.C. engine applications: A Newton Chambers Model 304 excavator powered by A.E.C. AVU470G engine; Coles crane with AVU470 engine; below, Allis Chalmers solids handling pump set with AV690G engine; and, right, a spectacular shot of an Allis Chalmers TL14 front end loader with A.E.C. AV312E engine

and of the many applications of the industrial versions.

There were engines for all sorts of stationary purposes, either for mounting on a base or in power-pack form. There were engines in the ground servicing units for airports, engines in excavators, in mobile cranes, in graders and loaders and also of course the conventional applications for compressors and pumping units. The exhibition at Southall arranged by the Diesel Engine Division also included various engines from the automotive series, either as used in the A.E.C. range of vehicles or as supplied to other vehicle manufacturers.

AV Wet-Liner Series

Of the industrial diesel units the best known and

AV Wet-Liner Series

Of the industrial diesel units the best known and most widely used are the AV410 and the AV470 units which have been in large-scale production for several years. Their notable success as power units for generating and pumping sets, excavators, and numerous other industrial purposes has set the pattern for the range of wet-liner directinjection A.E.C. diesels. These are six-cylinder units generating 112 and 126 h.p. on normal automotive type duties, but rated at 79 and 98 h.p. when in continuous service. The AV470 can be equipped for turbocharging and in that case pro-

The A.E.C. industrial diesels can be fitted with alternative dynamos and fans and the positioning of wells in the sump and such items as the exhaust manifold and the inlet manifold can be varied to manifold and the iniet manifold can be varied to fit specific applications. Other additional equip-ment to adapt the engines to industrial uses includes engine speed indicators, hour meters, automatic shut-down equipment and speed control, crankshaft vibration dampers, air compressors, various types of couplings, torque converters and power take-offs. power take-offs.

Locomotive Crankpin Repairs

USE OF MASTER-HONE EQUIPMENT

the equipment in use on a shunting locomotive



The Master-Hone in use

crankpin, from which only the connecting rods had to be removed to permit the work to proceed, with the locomotive still on rail.

Four crankpins were operated on, two 4½ in. dia. by 4½ in. long and two 3¼ in. dia. by 4½ in. long.

COST and time of locomotive crankpin repairs

can be considerably reduced by the use of Master-Hone equipment developed and patented by Nicol and Andrew, Limited, Hillington Industrial Estate, Glasgow. Our illustration shows

Micrometer readings showed variations in all crankpins of up to '060 in. The pins were ground round and parallel to within '002 in. by removing '070 in. of stock from each pin. The resultant surface finish was 6 micro inches. In this repair, one Master-Hone and transmitter and two operators completed the work on all four pins in a total of

RAIL-HANDLING CLIP

Useful Lifting Accessory

DESIGNED for use in lifting and handling a wide variety of standard rail sections, the Goliath rail clip has been introduced by Lifting Gear Products (Engineering), Limited, Petre Street, Sheffield, 4. The design is such that the rail is gripped positively as it is lifted and that it is impossible for the jaws to open accidentally. It is claimed that the clip is extremely easy to handle and that it can be disengaged instantly from the rail.

The Goliath clip, which is the subject of patent applications, has an overall length of about 18 in. and a width over closed jaws of 6½ in. It weighs 21 lb. Each unit is tested to double the rated safe working load to comply with the requirements of the 1937 Factories Act.



Originators of two simple movements to clear the route



NX ROUTE RELAY INTERLOCKING





For speeding up traffic and reducing manpower requirements, the NX (eNtrance/eXit) system of train control provides a safe, efficient and simple method of power signalling. Two simple movements set all necessary points and clear signals for a complete route.

Console and illuminated diagram installed at Potters Bar, British Railways, Eastern Region

2 Control panel at Temple Mills West, British Railways, Eastern Region, operating signalling and interlocking for the west end of Temple Mills Marshalling Yard.

3 Control panel at Faversham, British Railways, Southern Region, controlling signalling at Faversham Station and the junction for the Canterbury, Margate and Romsgate lines. Photographs by courtesy of British Railways.



AEI-GRS LIMITED, 132-135, LONG ACRE, LONDON, WC2 TEMPLE BAR 3444 An AEI Company

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Miles better!

* Special tread compound

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A great BRITISH tyre-with a great BRITISH name!

JOHN BULL RUBBER CO. LTD., LEICESTER

THE CARTER PATERSON STORY

Centenary of a Parcels Service

2-ERA OF PROVINCIAL EXPANSION*

THE 1914-18 war ended, Carter Paterson faced the inevitable stocktaking. It was still substantially a London business, although the first country motor service, to Brighton, had been inaugurated about 10 years earlier, and a "Home Counties Motor Express, under the management of Carter Paterson and Company" was formed in February, 1911. It added areas about Watford, St. Albans, Romford, Woking, Dorking and Reigate to the London and suburban area already served. By this time, too, motor services were in operation to Maidenhead, Hastings, Margate and Southend in addition to the original Brighton venture. On top of this the company had agents in quite a number of provincial towns to whom it could dispatch packed parcels by rail, and a few of them provided return traffic. In London there were by 1914-27 depots, almost all of them satisfactory for the horse van but hopelessly impracticable for the larger motor vehicle. London was divided up into 800 delivery rounds, each of them about half a square mile in area; the horse reigned supreme here. Clearly such a multiplicity of depots, some of them inherited from the other companies, was going to be wasteful with the speedier motor. Moreover THE 1914-18 war ended, Carter Paterson faced

them inherited from the other companies, was going to be wasteful with the speedier motor. Moreover, the face of London was changing rapidly, her suburbs pushing out. People no longer lived over their shops, or a few streets away from their work-

conveyor. Acton followed in 1932, Surbiton at Christmas, 1935. Surbiton had a rail connection from the outset, also yard trolleys for standing containers were dispensed with, containers being positioned on the platform itself by overhead traverser. Big strides were being made in the application of mechanisation. Each of these large new depots represented at that time (as they would today) a very considerable capital investment and they stand as a testimony to Carter Paterson's faith in its future—and it must be remembered that in the late 1920s and early 1930s the future must often have seemed dim.

Not content with the rejuvenation of the London business, Carter Paterson was by the end of the

Not content with the rejuvenation of the London business, Carter Paterson was by the end of the 1920s embarking on what was to prove a rapid extension of its activities into the provinces. One of the first trunk motor services was established about this time with Leicester, where a depot was opened and interests secured in carriers in Leicester, on the South Coast and in Liverpool (referred to in more detail below) were to form the framework of a provincial area which by 1939 reached as far as Blackpool, Newcastle, Leeds, Hull, Swansea, Exeter and Norwich, together with the four Scotisch in the coast of the coast tish cities by agency arrangements concluded in the previous year.

Initially most of these connections were by rail



This 1927 Albion was a vehicle well represented in the Carter Paterson fleet; right, electrics delivered from the General Vehicle works about 1923

place, industries were springing up in the outer suburbs and an entirely fresh pattern of needs was emerging. It was decided to enlarge City Basin, which was eventually bounded by City Road, Dingley Road and Macclesfield Street (now Macclesfield Road) into a large central sorting depot, replacing Central Street in that role, and to have a depot at Chelsea for the West End trade. a depot at Cheisea for the West End trade. Seven large suburban depots were envisaged—at Croydon, New Malden, Acton, Harrow, Tottenham, Stratford and Eltham, with inter-depot transfers to obviate much traffic going through Macclesfield

Six of these depots (not all of them new buildings) had been established by 1932, by which date most of the small depots had been eliminated. The last depot, projected for a site on the Kingston by-pass at New Malden, was not built there but was erected adjoining Surbiton Station, and opened in 1935.

Design of Central Depot

Progress with the central depot proved a more difficult proposition. City Basin had been inherited from Pickfords in 1912. The latter had acquired it as a canal head for its boats plying to and from London via the Regent's Canal. In its heyday it was probably the largest carrier's yard in London. Now parts of it were derelict and the canal basin had to be filled in. As early as 1920 Carter Paterson was talking of its plans for the new depot. It was to have an elaborate overhead electric conveyor circuit (it never materialised) for moving the lift-van bodies that were already in use between vehicles, loading platforms and storage site. Convehicles, loading platforms and storage site. Conveyors were not proposed on the platforms them-

However, it soon became apparent that decentralisation of traffic between suburban depots might

service to agents but by the mid-1930s a road service had been substituted in the case of Manchester, largely to combat the growing competition of other smalls carriers, notably Bouts-Tillotson Transport and Fisher Renwick (which had begun to operate long-distance road vehicles by this period); by 1939 a significant proportion of provincial traffic was routed by road. It should not be inferred from this that the possibilities of roadrail transfer were overlooked or abandoned. On the contrary, container service between Birmingham and London via the G.W.R., had been established in connection with Midland "Red" motor van parcels traffic for London (and continued after this parcels service was acquired by Pickfords in 1934). A London—Manchester container service had also been started.

By 1933 Bedford depot was transferred to a

been started.

By 1933 Bedford depot was transferred to a new rail-connected site and a Colchester container was put on. Sidings were put in at Croydon and Brighton so that, in this instance, railway vans could link the two depots. The Surbiton rail platform was designed with a two-fold objective; in addition to loading its own traffic in rail vans Carter Paterson was to perform railway cartage in the area. The scheme did not fulfill the high hopes expected of it and has been described as "the right idea in the wrong place." the wrong place.

Provincial Carriers Acquired

The first of the provincial acquisitions was South Coast Carriers, Limited, which had been started by Mr. R. W. Angell in the 1920s. An interest had been held since 1928, when Angell had already been a C.P. agent for a few years, and the company was registered at this point. Control was assumed in 1931, by which time the base was at Yapton, near Arundel, serving Portsmouth and Brighton,



In the 1920s the depot transfer lorry was a Leyland R.A.F. type; from 1930 onwards it was succeeded by the Albion 4-tonner, with trailer. Express Motor and Body works turned out many van bodies with side panels fabricated from American cloth

seriously modify these early plans and it was seriously modify these early plans and it was decided to defer building, except that the motor overhaul works and the body works were to be transferred from Walthamstow and Spencer Place, respectively, to occupy a part of the City Basin site. Much effort was expended on designing the parcels premises and visits were paid abroad to inspect new methods employed in similar undertakings there. It was not until 1937 that work was put in hand on a comprehensive redevelopment of the site; this was halted by the outbreak of war and has not in fact been resumed since in view of changed circumstances. Improvements had however been

not in fact been resumed since in view of changed circumstances. Improvements had however been made before 1937; the first parcels conveyor belt installed by Carter Paterson made its appearance at Macclesfield Road in 1928 and the engineering workshops, designed to deal with a fleet of 1,500 motor vehicles, were completed in 1931. The fleet at that time numbered some 1,000 vehicles. A byproduct of all the activity in this period was the creation in 1925 of a new company, Tersons, Limited, out of what had been the building department. It was to remain a Carter Paterson company until nationalisation.

The first entirely new suburban depot, at Purley

The first entirely new suburban depot, at Purley Way, Croydon, was opened to traffic in 1929. It was the first designed de novo with a platform

and there were 20 vehicles. By 1933 these had multiplied to 50—in marked contrast to the painful progress of the formative years—depots had been opened at Eastleigh and Bristol (to the latter Carter Paterson put on a service from London) and the Bournemouth area had been added. Next to come into the fold, and in the following

year, 1932, was Leicester and County Carriers, Limited, centred in that city. The pattern was similar—formation of a company "with Carter Paterson association," but actually under control of the latter. The "Leicester and County Carriers Depot" was opened in 1924 at the instigation of Depot was opened in 1924 at the institution of Leicester County Chamber of Commerce purely as a clearing house for parcels. Like some other ventures of this nature it did not prosper and the 1932 negotiations were the result. L.C.C. had used hired vehicles for some time and it hired C.P. vehicles until it was authorised to purchase its own.

Entry into Liverpool

This phase of provincial expansion was completed in 1933 with the largest acquisition to date, that of Karriers Parcels Delivery Service, in Liverpool. Karriers Parcels Delivery, Limited, was registered in March of this year to effect the change-over. Established by Mr. W. S. Finlayson in 1919, Karriers by this time had depots in Liverpool.

(Continued on page 22) (Continued on page 22)

MILES AHEAD ...



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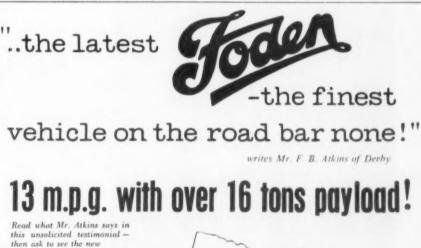
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* The first portion appeared June 11.

EXPORTS

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NEWS FROM ALL QUARTERS

Mumbles Car on Middleton Railway

An electric car from the Swansea and Mumbles Railway has arrived in Hunslet sidings, Leeds. It is intended for operation by the Middleton Railway Preservation Society. It is a double-deck passenger coach and will make its first appearance in Leeds as part of the Rag Week celebrations. The Hunslet Engine Co., Limited, is supplying an engine to draw it in a private siding at Hunslet.

Aid for West German Railways

What is in effect a doubling of the subsidy to the German Federal Railway has been authorised by the Government. In future the undertaking will receive about £60 million annually in various forms of assistance. Moreover, it is proposed to waive a large sum claimed by the Government against the railway administration, in respect of which repayment and interest totals about £7½ million annually. In future, the railways will, with certain important In future, the railways will, with certain important exceptions, have greater freedom in raising fares without Government approval. X

Frankfurt Wavers

The Mayor of Frankfurt-on-Main has rejected the idea of an Alweg monorail system for the city and spoken in favour of an underground tram network spoken in favour of an underground tram network for the city centre. A reorganisation of the Frankfurt tram system is to be planned in which the track will be run through shallow tunnels in the centre and along reserved tracks without crossings elsewhere. Only a few weeks ago the Frankfurt Social Democrat faction had put up a recommendation that trams should be almost completely scrapped in the city and an Alweg system installed.

KOK BIOK Medway Road Bridge

Medway Road Bridge

Work is to start shortly on a concrete bridge with the largest pre-stressed clear span (500 ft.) in the world. It will carry the Medway Towns motor road over the River Medway. The Minister of Transport has awarded a contract amounting to £2,325,931 to J. L. Keir and Co., Limited, in association with Christiani and Nielsen, Limited, for the construction of the bridge and approach viaducts. Construction will take about two and a half years. Work on the motorway itself, which will take less time to complete, will begin later.

S.A.R. Suburban Modernisation S.A.R. Suburban Modernisation

Dark brown for suburban trains in South Africa is on its way out. Coaches now being built for the Cape Western system will have a new livery. The new coaches will be similar to those already operating on the Reef, which have sliding doors. They are being manufactured in Nigel, Transvaal, and represent the biggest single order ever placed by South African Railways with a local manufacturer. There will be 113 motor coaches, 60 driving trailers and 276 trailer coaches. They will be of steel construction. Those operating on the Reef have a smoke-blue colour scheme. The report says that when sliding-door coaches are introduced in the Cape Peninsula (no date is given) the opporthe Cape Peninsula (no date is given) the oppor-tunity will be taken of changing and improving the colour scheme. Experiments will be undertaken to determine which colours will be most serviceable for interior and exterior use.

Off-Stage Noises at York

British Railways has been asked by the York Festival authorities "not to let off so much steam" during the performances of the mystery plays. Some of the "elevated moments" of the plays have been spoiled by the noise of locomotives across the river, it is complained.

U.S. Scheme for Local Train Service

Voters in four U.S. townships near Chicago have rejected a plan for subsidised public transport. If the plan had been adopted, the districts would have been empowered to levy a real estate tax and to divert local shares of petrol taxes to restore service on the Chicago, Aurora and Elgin Railway which cased corrections in 1958. ceased operations in 1958.

100 Progress of Eurofima

Eurofima, the international concern for the financing of railway material, announced at its annual meeting in Basle a dividend for 1959 of 4 per cent, the maximum permitted by its statutes. The company, now the possessor of 5,600 rail goods wagons, all of which have been supplied, and 250 diesel locomotives, some of which are still being built, recorded a net profit of S. Fr. 998,796 last year.

Buffets for Newcastle—Carlisle Diesels
On June 13 a new miniature buffet service was

On June 13 a new miniature buffet service was introduced by North Eastern Region, B.R., on selected weekday diesel trains between Newcastle and Carlisle. Four trains in each direction are equipped with the new miniature buffets and these are the 10.30 a.m., 12.20, 3.20 and 4.20 p.m. ex Newcastle and the 1.00, 2.20, 5.25 and 7.20 p.m. ex Carlisle. Located in one car of each of these four-car diesel trains, the miniature buffet has one attendant to serve, from the counter, a variety of light refreshments and drinks.

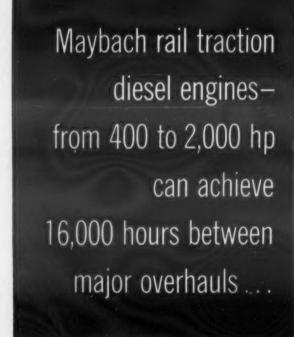
Technical Assistance from S.A.R.

Technical Assistance from S.A.R.

The general manager of the South African Railways, in an address to the conference of general managers of railways in Central and Southern Africa in Johannesburg, promised co-operation with the emerging African states. He said: "These new states will need guidance, and speaking for the South African Railways, I can say we will have no hesitation in placing our experience and knowledge at their disposal." He added that ways and means of providing this guidance would have to be worked out carefully with due regard to the sensitiveness that was bound to be allied to the early steps of independence. independence.

Pullman Employees of New York Central

Pullman Employees of New York Central Wage increases and fringe benefits for members of the U.S. Brotherhood of Sleeping Car Porters have been placed in effect by the New York Central as the result of negotiations just completed between the union and management. The new agreement applies to former employees of the Pullman Company who were transferred to the payroll of the New York Central when the latter took over its Pullman operations in July, 1958. The management at first tried to bar some of them under its rule against hiring new workers beyond the age of 45 years. The union, however, has successfully overcome this proposal.





. ANOTHER ENGINEERING ADVANCE FROM BRISTOL SIDDELEY

Bristot Siddeley Engines Limited produce Maybach* rail traction diesel engines. Covering a power range from 400 to 2,000 hp, these diesels are amazingly reliable and have shown that they can achieve major overhaul lives of 12,000 to 16,000 hours!

The proven basic design features of the whole range (straight 4 to 16-cylinder V) are the same, and each unit can be turbo-charged, or turbo-charged and intercooled. The range operates up to 1,600 rpm and combines the best performance and design qualities of high, medium and lowspeed diesel engines: light weight and compactness; excellent thermal efficiency; and extremely long life.

Advanced design features

The pistons are pressure-oil cooled. This gives very efficient heat dissipation and reduces liner and gas ring wear to a minimum. The roller bearing, disc-webbed crankshaft is exceptionally rigid within its tunnel housing, and in practice withdrawal is not normally necessary before 12,000 hours running. So low is big end bearing wear that in some cases the protective lead flash has been found to be intact when examined after 15,000 hours

Since the cylinder bore and stroke, and the majority of components, are identical in all models, spares stocks are considerably reduced. Servicing also has been greatly simplified because much thought has been given to accessibility and the removal of components. And the engines are suitable for both hydraulic and electric transmission.

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For further information please write to: Maybach Sales Manager, Bristol Siddeley Engines Limited, PO Box 17, Coventry, England.

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COMMERCIAL AVIATION

Aeroflot Expansion Plans

DC8 TECHNICAL CO-OPERATION

PLANS for the rapid expansion of Russian civil air transport outlined recently by Mr. Yevgeny Loginov, head of Aeroflot, include reconstruction of many airports, construction of new airports and introduction of new aircraft types on both home and expanded international services. In Moscow, Vnukovo Airport is already being rebuilt, international passenger services meanwhile using Sherementievo, and another big airport is being built at Domodedovo. Mr. Loginov said that by 1965 Moscow airports would be handling 50,000 to 60,000 passengers a day. He intimated that negotiations would soon be started for a Moscow—New York service and through services to Japan and Indonesia were also contemplated. Turbine aircraft already accounted for 56 per cent of all Russian passenger traffic, which in 1959 equalled that of the whole six years ended 1956, and many present piston-engine routes would soon be using the new turbojet TU124 and turboprop AN24 high-speed medium-capacity aircraft.

Runway at Guernsey

Two-thirds of the 4,800-ft. runway at Guernsey Airport was brought into use last week. The airport has long needed a hard runway and has been closed on a number of occasions due to muddy conditions.

B.O.A.C. Resumes Amman Service

The British Overseas Airways Corporation resumed services between Britain and Jordan on June 3 after a lapse of nearly four years. Operated by Bristol Britannias, the service leaves London each Friday and, flying via Rome, calls at Amman on Saturdays en route to Kuwait and Bahrein. Return flights leave Amman on Sundays.

P.A.S. Service Inaugurated

Persian Air Services on June 20 started its thrice-weekly services to Tehran, of which two are routed London—Brussels—Geneva—Tehran and London—Paris—Tehran respectively, the third emanating from Brussels through Geneva to Tehran, with a Sabena London—Brussels connecting flight. The services are operated with Douglas DC7C aircraft and include de luxe and the services are operated with Douglas DC7C aircraft and include de luxe and

P.A.A. Great Circle Jet Service

P.A.A. Great Circle Jet Service

Pan American World Airways will introduce direct jet service over the northern great circle route between San Francisco and Tokyo on July 1, it has been announced by Mr. Willis G. Lipscomb, vice-president traffic and sales. Great circle flights from San Francisco to Tokyo will be made in 13 hr. or 6½ hr. less than via the Central Pacific route. The great circle flight will operate once weekly and Central Pacific flights the other six days.

Passengers on U.A.L. DC8s

Douglas DC8s of United Air Lines have carried half a million passengers in the first eight months of the company's jet service. Revenue passengermiles for DC8 flights in the period totalled 723,300,000. United inaugurated the first coast-723,300,000. United inaugurated the first coast-to-coast DC8 service in September, 1959, and now provides jet flights to 12 cities on its 14,000-mile network. The last of 40 DC8s on order will be received by United by mid-1961.

Newcastle Wants Grant

Newcastle upon Tyne City Council has interviewed the Ministry of Aviation regarding a £230,000 scheme for the erection of new terminal buildings at Woolsington Airport. The council is trying to persuade the Ministry to make a grant towards the cost. It has pointed out that although Woolsington is the only airport serving North-East England the whole cost of running and main-taining it is being borne by Newcastle Corporation.

B.O.A.C. in Spain and Portugal

B.O.A.C. in Spain and Portugal

The first B.O.A.C. sales offices in Spain and
Portugal will be officially opened in Madrid on
July 14 and Lisbon on August 1. The establishment of offices in these important centres on the
B.O.A.C. route from Europe to South America
comes only six months after the re-opening of the
route by the corporation. Both cities are at
present served regularly by Comet 4s flying to and
from Recife, Sao Paulo, Montevideo, Buenos Aires
and Santiago.

Estimated Traffic in April

Estimated Traffic in April

It is provisionally estimated from statistical returns received to date that United Kingdom airlines' traffic on scheduled and inclusive tour services in April amounted to 37 million short ton-miles. This represents an increase of 27 per cent compared with April last year. Capacity operated increased by 24 per cent and the overall load factor rose from 60 per cent to 61 per cent. In the first four months of 1960 traffic totalled 122 million short ton-miles compared with 99 and 86 million short ton-miles in the first four months of 1959 and 1958 respectively. of 1959 and 1958 respectively.

Technical Co-operation on DC8

Following the introduction in Europe of the Douglas DC8 by K.L.M. (Royal Dutch Airlines), followed by Pan-American Airways, Scandinavian Airlines System, Swissair, Alitalia and, at a later date, Japan Air Lines, an agreement has been signed by K.L.M. with these other DC8 operators. It covers the pooling of technical equipment, particularly spares, at 25 stations through which these airlines operate DC8s. K.L.M. will have a spares stock at only six stations; other airlines will share the spares pool at the other major airports. All concerned will benefit from such an agreement for it means that only one airline in the group. for it means that only one airline in the group stocks, say, spare engines at a particular airport. As each cost £100,000 it represents a considerable reduction in overheads occasioned by spares stocks.

Air Communications in the Caribbean

What is claimed to be the world's largest and most up-to-date inter-island aeronautical telecommunications system, linking the Eastern Island Territories of the West Indies, was officially Island Territories of the West Indies, was officially inaugurated in Barbados on June 10. This new \$2 million multi-channel v.h.f. system was planned and installed by International Aeradio, Limited, in conjunction with Pye Telecommunications, Limited, Ericsson Telephones, Limited, and Creed and Co., Limited. It provides automatic telephone and teleprinter service for airlines operating in the Caribbean and gives instant contact between airports, airline offices and aircraft 24 hours a day irrespective of weather and other conditions. The irrespective of weather and other conditions.
system is operated by an I.A.L. subsidiary pany, International Aeradio (Caribbean), Limited.

PULLMAN CHAIRMAN



Sir JOHN ELLIOT, M.Inst.T.

Chairman of the Pullman Car Company, which from July 4 will provide British travellers with diesel-electric trains of standards up to or even exceeding those of Trans-Europ-Express, is Sir John Elliot, who is also chairman of Thomas Cook and Son, Limited. Born in 1898, he was educated at Marlborough and the Royal Military College, Sandhurst. Gazetted to the 3rd Hussars in 1917, he was on active service with his regiment until 1920, when he resigned his commission to take up journalism. After experience in America and in England, he joined the Southern Railway Company in January, 1925, as assistant to the general manager in charge of public relations and advertising. He succeeded in reviving public esteem towards the railway and in 1930 was appointed development officer in the newly formed traffic department; there he was responsible for reorganising the sales and canvassing arrangements of the company. Three years later he was made assistant traffic manager; he became assistant general manager in 1937. He occupied the position of deputy general manager, to which he was appointed in 1939, throughout the war and until October 1, 1947; he then took over the duties of general manager from Sir Eustace Missenden when the latter became chairman of the Railway Executive. He became chief regional officer, Southern Region, British Railways, on January 1, 1948, and was appointed to a similar position with the London Midland Region two years later. In February, 1951, he again succeeded Sir Eustace Missenden, this time as chairman of the Railway Executive. Just over two years later, when the Railway Executive was abolished and its functions absorbed in the British Transport Commission, he was invited to become chairman of the London Transport Executive; he took up that task on October 1, 1953, and, after initiating a considerable programme of replacement and development, retired from the position at the end of June, 1959, when he assumed the chairmanships of the Cook and Pullman boards, of which he had already been a member. He was president, Institute of Transport, 1953-54, and vice-president, International Union of Railways, 1947 and 1951-53. Sir John was closely connected with the organisation of the railway-operated air services from their inception. In 1935, with Sir Eustace Missenden, he visited America and Canada to study rail, road and air conditions, and in March, 1949, he visited Australia at the invitation of the Government of Victoria to investigate railways and road transport in that State; following his report the financial structure of the railways was reorganised and rehabilitation begun. In 1947 he was awarded the U.S.A. Medal of Freedom with Bronze Palm for transport services to U.S. Forces in Europe during the war and in 1953 he was made an Officer of the Legion of Honour. He was knighted in the New Year Honours of 1954.

LETTERS TO THE EDITOR

Electric Traction History

STEWARTS LANE DEPOT

STEWARTS LANE DEPOT

SIR,—Many students of electric traction history are aware of the existence of the Electric Railway Number of Cassier's Magazine, of August, 1898, very few possess a copy of this rare item, and not many have access to one—yet this issue of Cassier's is a profusely illustrated 300-page record of the history and development of electric railways and tramways in the United Kingdom, Europe and America up to that time, and is a valuable source of information for all transport and traction students and enthusiasts.

To make this Cassier's more widely available the Light Railway Transport League is trying to arrange for a reprint of it, 8½ in. by 5½ in., in stout covers. The post-free pre-publication price will be two guineas—a price which compares favourably with that of 300-page demy-octavo books of today. (The price after publication will be £2 10s.) Your readers are invited to write for the Cassier's Prospectus, giving further details of the scheme, to the Hon. Secretary, L.R.T.L., 245 Cricklewood Broadway, London, N.W.2. Early response is requested, for only with the assurance of ample support will it be possible to complete the project.—Yours faithfully.

J. Joyce, Hon. Secretary.

J. Joyce,
Hon. Secretary,
Light Railway Transport League,
London, N.W.2.

Working at Stewarts Lane

Working at Stewarts Lane

SIR.—The very interesting article about the modernisation of the Southern Region depot at Stewarts Lane in your issue of March 26 led me to turn up some old notes of mine about heavy traffic at Victoria (Eastern) in pre-1939 days. On July 31, 1937—the Saturday before August Bank Holiday—there were 29 departures between 10 a.m. and 14.59 a.m., of which five were electric suburban trains and 24 steam trains—eight Continentals to Dover Marine and two to Folkestone Harbour, 13 to the Kent Coast and one to Dover via Chatham. Five outgoing steam trains were formed of incoming services, and eight empties were worked in by the engines for later departures. The average late departure of all trains was 7 min.

I cannot recall ever seeing as many as six light engines arriving coupled, and it would appear that there is some misapprehension here. The number of engines stabled at Stewarts Lane declined as successive stages of the Central Section electrification were opened, and I have a note that the number had fallen to 127 by 1937.

I may add that on August 2, 1958—again the Saturday before August Bank Holiday—there were 12 departures from Victoria (Eastern) from 11 a.m. to 12 noon. Four were electric trains and eight steam. The latter comprised one Continental to Dover Marine, six to the Kent Coast and one to Dover via Chatham. One train left 14 min. late and another I min. The practice of using incoming trains to form outgoing services, and working in empties by engines for later departures still obtained.—Yours faithfully.

G. T. Moody.

G. T. MOODY.

74 Claverdale Road, Tulse Hill, S.W.2.

The Driver's Leg

The Driver's Leg

SIR,—May I reply to your correspondent who queried in your issue of June 4 the action of a bus driver in sitting on his leg whilst driving. I can offer two explanations. The first is that supposing the bus does two journeys straight off, during the first one, a busy one during the peak (particularly at evening), the left leg is busy with the operating pedal in full use. After the peak, particularly in quieter parts of the road, one becomes aware of the inactivity of the left leg, instinctively begins to fidget and wants to move it about. However, as there is not much need to depress the selector pedal an alternative position of the leg is sought, and in your correspondent's report the driver apparently used an extreme one. My own position in similar circumstances used to be to stretch the left leg across to a position in front of the brake. (I stress this was on quieter stretches of the road.)

My alternative explanation is a soft seat. This can cause excruciating agony during a duty and every

cause excruciating agony during a duty and every movement of the legs is torture. I have heard of drivers sitting on their leg to try to relieve this distress.—Yours faithfully,

H. W. COOPER

166 Cheshire Street, London, E 2.

FORTHCOMING EVENTS

June 25.—W.W.R.T.S. E. Tonks, "Edge Hill Light Railway, Stratford-on-Avon, and Midland Junction Railway." Exchange Restaurant, Birmingham, 7.15 p.m. June 23—July 8.—Machine Tool Exhibition. Olympia. June 27—July 1.—British Fire Services Association. Tournament and Conference, Bognor Regis.

June 29.—L.R.T.L. Messrs. Young and Ballment, "Australasian Tramway Museums." Its Drummond Street, N.W.1, 7 p.m. July 2.—P.W.1. Visit to Royal Albert Bridge, Plymouth. Joint visit with Exeter and West of England section. July 3.—S.C.T.S. Trolleybus tour of Portsmouth. July 5-8.—Royal Agricultural Show. Cambridge. September 5-11. Society of British Aircraft Constructors. Annual flying display and exhibition. (Public days September 9-11.) September 12-16.—Municipal Passenger Transport Association Conference at Douglas, 1.0.M.

September 23-October 1.—Commercial Motor Show. Earls Court.

KEY TO CODE

KEY TO CODE

A.D.A.—Aluminium Development Association; A.F.—
Aviation Forum; B.I.R.E.—British Institution of Radio
Engineers; D.E.U.A.—Diesel Engineers and Users Association; E.R.S.—Electric Railway Society; H.C.V.C.—Historic Commercial Vehicle Club; Inst.C.E.—Institution of Civil Engineers; I.E.E.—Institution of Civil Engineers; I.E.E.—Institution of Railway Signal
Engineers; I.R.T.E.—Institution in Railway Signal
Engineers; I.R.T.E.—Institution of Mariney Signal
Engineers; I.R.E.—Institution of Mariney Signal
Engineers; I.Mer.E.—Institution of Machanical Engineers; I.N.A.—Institution of Mariney Signal
Engineers; I.Mer.E.—Institution of Mechanical Engineers; I.N.A.—Institute of Traffic Administration.
I.M.R.L.D.S.—London Midland Region Lecture and Debating
Society; I.R.T.L.—Light Railway Transport Lesgue; N.T.M.R.C.
—Norbury Transport and Model Railway Club; O.S.—Omnibus
Society; P.R.D.G.—Peterborough Railway Discussion Group;
P.V.O.A.—Passenger Vehicle Operators Association; P.W.I.—
Permanent Way Institution; R.A.E.S.—Royal Aeronautical
Society; R.C.H.S.—Railway and Canal Historical Society; R.H.A.
—Road Haulage Association; R.A.E.S.—Royal Society of Arts;
Riy.S.A.—Railway Club; Riy.E.C.—Railway Enthusiasts Club;
Riy.S.A.—Railway Club; Riy.E.C.—Railway Enthusiasts Club;
Riy.S.A.—Railway Students Association; S.C.T.S.—Southern Region
Lecture and Debating Society; S. R.L.D.S.—Southern Region
Lecture and Debating Society; S. Wales and Mon. R.D.L.D.S.—
South Wales End Mon. Railway and Docks Lecture and Debating
Society; W.W.R.T.S.—West Warwickshire Railway and Travel
Society; W.W.R.T.S.—West Warwickshire Railway and Travel
Society.

LEEDS NEVILLE HILL TRACTION DEPOT

Part of the North Eastern Region Modernisation

ON Friday of last week Sir Linton Andrews, Editor, Yorkshire Post, formally opened the North Eastern Region's modernised Leeds Neville Hill traction depot, which now becomes the main diesel multiple-unit depot in the Leeds area. New accommodation for servicing and maintaining diesel multiple-unit trains and diesel shunting locomotives has been provided and the steam locomotive shed has been reconstructed, embodying provision for easy transition from roundhouse to a straight shed for diesel-electric and electric locomotives.

The track layout has been designed to keep diesel trains separate from the steam side of the depot. Diesel trains enter the depot at Neville Hill West

a quick progressing of sets, the shed is permanently open at both ends. It is adequately equipped with high and low voltage plug sockets for hand wander lamps and portable power tools and overhead cold cathode electric lighting is installed with bulkhead lighting in the pits. Eight fuelling points serve all 12 car berths with a further four outside fuelling points along the north side.

The foundations of the building are in-situ concrete piles and reinforced concrete beams. The frame is of reinforced concrete with facing brick and patent glazed infill panelling. The patent glazing is set in pre-cast boot lintels and sills. The roof is carried on pre-stressed concrete beams and troughs and apart from pre-cast concrete walkways

been provided with fixed benches in the south-east corner. Ancillary accommodation includes an electricians' room and offices for the supervisory staff. The foundations and structure are the same as in the running shed except that the floor is at

Steam Locomotive Shed

Formerly the steam shed comprised four straight-walled sections with roads radiating from turntables, roundhouse style; it has been reduced to approximately half its original length and now accommodates only two turntables. This has been made possible by the reduction in steam locomotive requirements in the district following the

and what was formerly the steam locomotive repair shop has been adapted for this purpose by building a new pit 40 ft. long between the existing rails and by providing battery charging points, water hydrants and oil fuel supply. In addition, the lighting and heating has been modernised and the floor re-concreted.

lighting and heating has been modernised and the floor re-concreted.

The machine shop is located between the steam locomotive shed and the new diesel repair shop, roughly in the centre of the main block of buildings. It has been completely modernised with new lighting, heating and flooring and new machinery has been provided where this is necessary. The new shop includes office accommodation for supervisors and a tool store and there are separate locker







North Eastern Region modernisation schemes include a new marshalling yard at Healey Mills, which involves diversions of the River Calder; centre and right are scenes on the Alne-Pilmoor main-line widening from three to four tracks—the Tees-Tyne Pullman passing a Morris track layer at work on the new permanent way and looking north from Bridge 28 at Raskelf

Signalbox and pass through the running shed for routine examination, minor adjustments and fuelling. From that point the vehicles pass out of the depot at Neville Hill East to Waterloo carriage sheds or sidings for cleaning and return into traffic or are transferred to the repair shop for repairs or periodic overhaul. This modernisation was started three years ago and has been undertaken without major interference with the day-to-day operations. Although the steam and diesel sections have been segregated a central machine shop and stores depot has been provided; similarly administration offices, staff accommodation and amenities have been centralised.

M.U. Running Shed

M.U. Running Shed

The diesel multiple-unit running shed is a new building for the fuelling and servicing of diesel cars. Situated 500 yards to the west of the main depot buildings, it is 290 ft. long and has three tracks 12 ft. apart, each capable of standing a four-car diesel set under cover. Full length centre pits are provided under each track and the floor level is 18 in. below rail level to permit easy access to the underfloor equipment of the cars. In order to give

is patent glazed throughout. The inspection pits are in reinforced concrete with steelwork rail supports and the floor is in concrete. Built on to the south-east corner of the shed is a lean-to build-ing with accommodation for shed staff and stores. A small boiler plant supplies hot water heating through pipes built into the inspection pits. Electric extractor fans are embodied in the roof to clear exhaust fumes.

M.U. Repair Shop

The diesel multiple-unit repair shop is also a new building. Adjacent to the steam locomotive shed, it is 290 ft. long and has five tracks 15 ft. 3 in. apart, each equipped with full length centre and side inspection pits. It is open only at the west end and doors are fitted so that it can be totally enclosed when required. General illumination is provided by cold cathode electric lighting and the pits are equipped with bulkhead lights and compressed air supply.

pressed air supply.

Low and high voltage sockets are installed for hand wander lamps and portable power tools. Electric extractor fans in the roof keep the air clear of exhaust fumes. Portable work benches have

introduction of diesel multiple-unit trains and re-organisation of traffic working. The two remaining turntables are 55 ft. and 70 ft. in diameter and seven of the tracks and pits radiating from the larger one have been increased in length so as to accommodate larger types of locomotive. The electric lighting has been renewed up to modern standards throughout and high and low voltage plug sockets for hand wander lamps and portable power tools as well as an improved compressed air supply have been provided. The remaining roof area has been carried out with a view to the shed's ultimate conversion to a straight shed suitable for diesel-electric and electric locomotives and the alignment of two new locomotive stabling sidings provided outside the shed on the site of the former turntables is such that they may later be used without alteration to form straight approach roads into the shed.

Diesel Shunting Locomotive Shop

The replacement of steam shunting engines by light diesel locomotives necessitated the provision of separate fuelling, servicing and repair facilities

looking north from Bridge 28 at Rasken

and washing facilities for employees in this shop. The existing stores accommodation has been extended and modernised to provide a combined store for steam and diesel parts. It is located adjacent to the machine shop almost central in the main block of buildings. It is being equipped with new racking and storage tanks for lubricating oils. Serving counters are provided at both ends, one end serving the steam locomotive shed and the other the diesel repair shop. A new siding with an overhead gantry and hoist block has been provision for pumping direct into the storage tanks either from rail tankcars or from drums. The eight 7,000 gallon fuel storage tanks are served by a separate road. These tanks are installed within a bund wall and are located at the south-west corner of the diesel shunting locomotive shop. Undergound ducts link the storage tanks with the various fuelling points.

The diesel multiple-unit ru



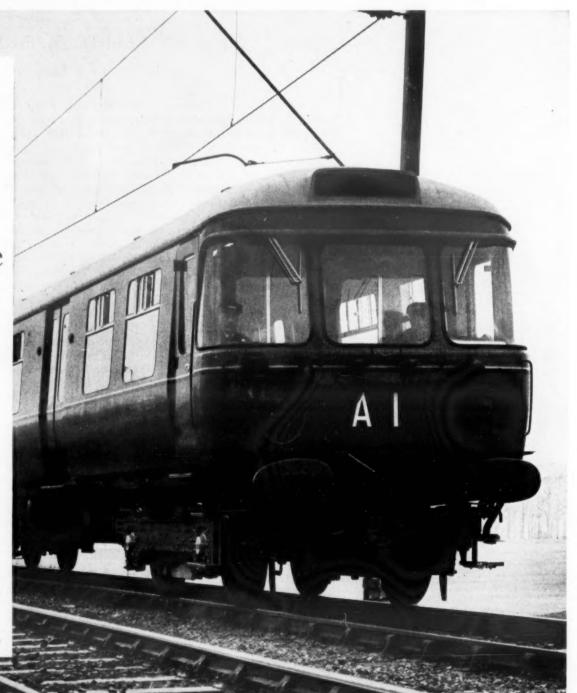
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Electric Multiple Unit made by Pressed Steel for British Railways



some 500 yards to the west of the main buildings and so has its own heating boiler installation. All the remaining buildings are heated from a centrally placed automatic oil-fired boiler installation. The boilers are capable of burning the dirty oil recovered from the sumps of diesel engines. Depot yard and standage sidings are illuminated by colour-corrected mercury vapour lighting.

Staff Amenities

Staff amenities have been largely centralised in rebuilt accommodation at the east end of the main buildings near to the main entrance to the depot. There is a new well-furnished and brightly decorated messroom equipped with gas cookers and water boilers. A new wash room has a treadle operated hot water fountain for hand and face washing and there are hot showers and hot air

Water temperature in the showers and also in Water temperature in the showers and also in the fountain is thermostatically controlled to avoid scalding. There are also wash-hand basins with hot and cold water and the room is glazed-tiled throughout. There is a new locker room fitted with wardrobe type lockers with a section of the room set apart for clothes drying. The depot offices have been refloored and refurnished and toilet accommo-dation has been brought up to modern standards.

Autumn Conference on A.C. Traction

WORLDWIDE INTEREST IN BRITISH METHODS

A DVANCED British techniques in the new a.c. system of railway electrification at industrial frequency have attracted worldwide interest and some 200 railway engineers from abroad will visit Britain this autumn for the British Railways Electrification Conference. They will see the new electric train services, expected to be in operation by September, on the Manchester—Crewe line of the London Midland Region. They will also be shown something of electrification progress in the Eastern Region, including the Colchester—Clacton—Walton line, which was the first line in Great Britain to be electrified on the British Railways new standard 25,000-volt 50-cycle a.c. system.

Exhibition of Equipment

Exhibition of Equipment
The conference, which will last for a week, opens on October 3. During the preceding week, as well as in the week afterwards, foreign visitors will be shown railway equipment in production at the works of various manufacturers who are suppliers to British and overseas railways. These visits will supplement the exhibition of manufacturers' equipment which is being specially staged at Battersea Wharf, London, concurrently with the conference. This exhibition will be opened by the Minister of Transport.

In this way, the engineers of railway administra-

Minister of Transport.

In this way, the engineers of railway administrations in many parts of the world will be able to study not only technical progress on British Railways, as shown by new trains in action, but the advanced techniques employed by British manufacturers in the production of locomotives and electric traction equipment of all kinds. The conference as a whole will be both a summation of technical achievement on British Railways and a "shop window" for British products for the rest of the world.

Programme

Programme

The conference will take place at the Institution of Civil Engineers, Westminster. There will be a formal opening ceremony on Monday, October 3, under the chairmanship of Sir Brian Robertson, chairman of the British Transport Commission. The Commission will give a luncheon for their guests at the Savoy Hotel after the opening session, and there will be a Government reception at Lancaster House that evening. On Tuesday, October 4, delegates will begin the discussion of some 40 technical papers which have been prepared by leading experts on both British Railways and the staffs of British manufacturers. On Wednes-

day, October 5, delegates will leave Euston by special train for Manchester, when they will have the opportunity of seeing the newly electrified lines between Manchester and Crewe. From Manchester they will travel by electric multiple-unit train to Crewe and visits will be made to the new power

Crewe and visits will be made to the new power signalbox at Wilmslow and to the electrification depot at Crewe.

Discussion of technical papers will be concluded on Thursday, October 6, at an all-day conference, the proceedings ending with a film show in the Great Hall of the Institution of Civil Engineers. On Friday, October 7, two special trains will take delegates from Liverpool Street for an all-day inspection of selected features of the electrification schemes and associated engineering works now inspection of selected features of the electrification schemes and associated engineering works now completed or in hand in that region. The visit will include the Liverpool Street suburban lines and the Colchester—Clacton—Walton line, where equipment is in use for the first time for the automatic change of voltage between 25,000 volts and 6,250 volts whilst the trains are in motion.

The programme will include a visit to the electric train servicing and maintenance depot at Ilford, one of the largest and most up to date of its kind in the world, where various types of electric rolling stock and traction equipment in service on the region will be displayed for inspection by the delegates.

Guildhall Dinner

On Friday evening, October 7, delegates will be entertained at Guildhall in London, by the British Electrical and Allied Manufacturers' Association and the Locomotive and Allied Manufacturers' Association of Great Britain. These two trade organisations are, jointly with the British Transport Commission, the sponsors of the entire conference programme.

conference programme.

The conference will offer railway engineers of other countries a unique opportunity of participating in the most comprehensive survey of railway a.c. electrification ever attempted. The manufacturers' facilities for viewing their works will also enable delegates to make a thorough survey of also enable delegates to make a thorough survey of the industry's extensive resources in a way that would not otherwise be possible in so short a time. British manufacturers are carrying out a construc-tion programme this year of over 350 main-line electric and diesel-electric locomotives and 129 multiple-unit electric vehicles in addition to large orders for overseas railways, with a wide range of electric power supply, control, signalling and ancillary equipment.

Runway Lighting at London Airport

FURTHER EQUIPMENT INSTALLED

NUMBER 1 Runway (10L-28R) at London Airport has now returned to service with centreline lighting added to touchdown zone lighting similar to that installed two years ago at Gatwick. The runway had been out of use during the past winter while the new lighting was being installed and a concrete stub laid forming the beginning of what will later be a fast turn off. Preparations have also been made for installing the new viewal glide path indicators.

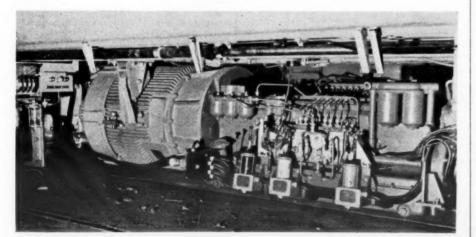
Preparations have also been made for installing the new visual glide path indicators.

The touchdown zone lighting extends over the first 3,000 ft. of each end of the runway, and comprises 12 pairs of transverse barettes at 250 ft longitudinal spacing; each barette consists of four uni-directional high-intensity lights spaced 5 ft. apart, the fittings projecting barely \(\frac{3}{2}\) in. above the runway surface. The inner lights of each barette are 37 ft. 6 in. from the centreline. The centreline lights are spaced at 100-ft. intervals from threshold to threshold; they are bi-directional but otherwise the fittings are similar to those used for the touchdown zones. All the lights are white and have five stages of brilliancy. They should prove particularly valuable in poor visibility; the touchdown zone lighting to assist a pilot when landing to judge the runway surface level and the centreline lighting as an aid to keeping straight on the run- out on No. 1 Runway.

way, particularly advantageous during take-off.
High- and low-intensity green threshold lights
and high-intensity green threshold wingbars are
now provided at both ends of No. 1 Runway, and
as new taxi routes are added to the central area
the green centreline taxiway lighting with red stop
bars at junctions is being extended to provide safe
guidance in all weather. in all weather

Success of V.G.P.I.

The two-colour R.A.E. Visual Glide Path Indicator system which was installed on Runway 28L last summer has been well received by pilots, and only minor adjustments have had to be made in the light of their reports. Similar installations are being provided at each end of No. I Runway and are to be brought into use before next winter. The V.G.P.I. system is regarded as a valuable aid to safety and it is expected that its use should result in more accurate approaches and less scatter of the in more accurate approaches and less scatter of the points at which aircraft touch down by day and by night. During the coming winter No. 5 Runway (10R-28L) will be withdrawn from use, when it will be extended westward so as to increase its length to 11,000 ft. Opportunity will then be taken to effect similar lighting improvements to those carried imilar lighting improvements to those carried



Underfloor Rolls-Royce 190-b.h.p. diesel engine and Stone Tonum alternator provide ancillary power in the "Midland Pullman" (see page 7)



AND MAKING TRACTION EQUIPMENT

You, as an engineer, know that there can be no sharp dividing line between designing and building. A good design incorporates experience gained in making, testing and commissioning similar equipment in the past. And, of course, it is also shaped by the experience of all sorts of people using the that could not be simulated in any test laboratory.

To a long-established company such as Crompton Parkinson this process of feedback of information to the designer is fundamental. In traction equipment, where space and weight must be kept down and yet robustness and accessibility are at a premiu it shows up in the simplicity and elegance with which these conflicting demands are reconciled. As, for example, by the special design of the ventilation of this railway compressor motor. The air circuit is continued by trunking to serve the compressor and its intercooler as well. In this design we were able to make direct use of the experience we had gained with earlier auxiliary motors-as well as more indirectly from hundreds of equipments built for main line locomotives, shunters, motor coaches and trolley buses.





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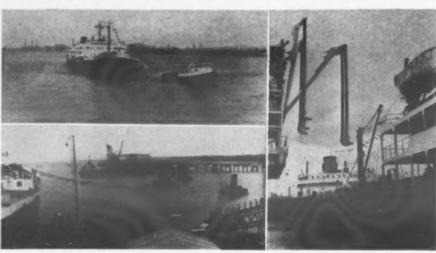
will keep you in touch with all British and Foreign transport developments TRANMERE OIL TERMINAL

Discharging at 7,000 Tons an Hour

WITH the arrival on June 8 of the tanker

Zenatia (38,000 d.w. tons), bringing a cargo
of 35,000 tons of crude oil from Kuwait
for the Stanlow refinery, Ellesmere Port, the new

These will continue to be used, but will be supplemented by the new facilities at Tranmere, which are designed to handle the very large super-tankers that are now coming into service. The basic



Scenes at the opening of Tranmere oil terminal: The "Zenatia" coming into berth; below, mooring to dolphins; and, right, adjustable fuelling hoists being lowered to connect with the

oil terminal at Tranmere, Birkenhead, was successfully inaugurated. This project, which was fully described in Modern Transfort of November 14, 1959, is a joint venture of the Mersey Docks and Harbour Board and the Shell Refining Co., Limited. Hitherto the refinery at Stanlow has been supplied by tankers using the Stanlow oil dock and the Queen Elizabeth II dock at Eastham, opened in January, 1954.

requirements that have been met allow for a maximum crude oil discharge rate of 7,000 tons per hour, a 3,000 tons per hour rate for fuel oil, and a 350 to 700 rate for fuel oil loading into the ship's bunkers. If necessary the new installation will be capable of supplying the refinery with eight million tons of crude oil per annum.

Tidal Problems

The design of the Tranmere project is believed to be the first of its kind in the world. Basically, it consists of two floating stages connected by a forked jetty to the land, where there is an oil storage tank farm. The stages are each moored by storage tank farm. The stages are each moored by four booms anchored to pillars set in the river bed, and designed to absorb the impact of the ship and to allow the stages to rise and fall with the tide without interference with the fixed jetties which carry the pipelines, road access and folw boom equipment. Similarly the moorings of the ship are to six circular floating dolphins which rise and fall with the tide and are anchored by Mannesman steel tubes set into the river bed.

Specially designed hoists have been provided at the head of each jetty to give adequate control of the six 12-in. flexible hoses as the ship moves up and down with the tide. The tankers that will first use the terminal can discharge at an individual rate of 4,000 tons per hour. Provision for even higher rates is possible should they be required.

Storage Area

On shore the terminal tank farm is built on 32 acres of land reclaimed from the bed of the Mersey by a limestone rubble wall with a 6-in. thick prestressed concrete plank diaphragm wall grouted into a concrete beam cast into the sandstone rock. The original surface of the site comprised river silt; this has been removed to give a rock foundation for the six large storage tanks, each with a holding capacity of approximately 20,000 tons of crude oil. There is also a 15,000-ton tank for fuel oil, used for replenishing the tankers' bunkers.

From the Tranmere terminal the crude oil will

From the Tranmere terminal the crude oil will be pumped to Eastham through a 24-in. diameter pipeline which at one point is taken in a tunnel 80 feet below the surface under the Bromborough Dock lock. At Eastham the pipeline joins the existing lines to Stanlow Refinery. The crude transfer rate to Stanlow is 1,300 tons per hour, with a possible increase of the hourly rate to 2,500 tons allowed for

New Ships on Order

New Ships on Order

The choice of the Zenatia to inaugurate the new terminal was particularly appropriate as she was built only three years ago by Cammell Laird and Co., Limited; the Cammell Laird yards adjoin the Tranmere site. Engined to give an average service speed of 16 knots on a daily fuel consumption of 86 tons, she is designed specifically as a crude oil tanker. The cargo pumping equipment has a capacity of 3,300 crude oil tons per hour, so that a full cargo of 37,000 tons can be pumped ashore in under 12 hours. She is a single screw steam turbine ship of conventional design and has an overall length of 700 feet, an 89 ft. beam and a summer draught of 36 ft. 3 in. At present she is the largest tanker to discharge on the Mersey, but by the end of this year it is expected that still bigger ships will be in service.

Apropos the increase in size of oil tankers it is interesting to notice that quite recently in 1948

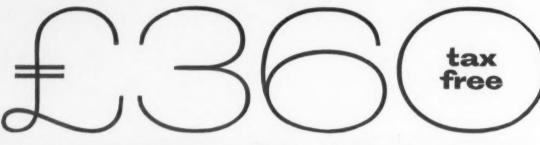
Apropos the increase in size of oil tankers it is interesting to notice that quite recently in 1948 the bulk of the Shell fleet consisted of 12,000 d.w.t. vessels with a speed of 12 knots and an average fuel consumption of 12 tons a day. However, the trend towards larger and faster ships was already established, as in that year the group ordered three 28,000-ton vessels. Within the next decade this figure had risen to 38,000 tons and this in turn will shortly be exceeded by vessels of up to be exceeded by vessels of up to 65,000 d.w.t.

Cammell Laird is currently building three very large oil carriers for Shell Tankers—one of 65,000 tons due for launching this year, and two 48,000-tonners scheduled for completion in 1961 and 1962. Swan Hunter and Whigham Richardson and 1902. Swan frunter and Wingham Renardson is building 65,000-ton carriers for the Shell fleet. Although the Tranmere terminal has been specifically designed to cope with these larger carriers, it will also handle smaller vessels until such time as the number of supertankers is sufficient to keep it fully occupied.

Principal Contractors

Principal Contractors

The main consultants for the terminal were Sir Bruce White, Wolfe Barry and Partners. The main site civil engineering contractor was A. Monk and Co., Limited, and the principal pipeline contractor was Sir Alfred McAlpine and Son, Limited. The storage tanks were constructed by Whessoe, Limited, pumping units by Mather and Platt, Limited, and Plenty and Son, Limited, and the flow boom equipment by Woodfield Hoist and Associated Industries, Limited.



1 ton payload 50 mpg or more



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MECHANICAL DETAILS: 4-cylinder, 848 ccs engine, 4 forward gears,





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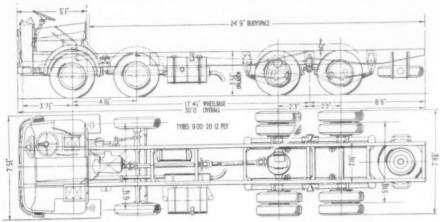
A.E.C. Mark V Mammoth Major Eight-Wheeler*

EXPRESS TRUNKING WITH 161-TON PAYLOADS

ONCE again the advantages of providing an engine of greater power than average in a heavy commercial vehicle have been demonstrated in our recent road test over the standard Modern Transport route of the A.E.C. Mark V Mammoth Major eight-wheeler. The results obtained in the various checks only partly indicate the superior performance put up by the vehicle, for there is no easy means of measuring the relief of strain and fatigue in the driver, and in the vehicle components, brought about by the altogether easier

spring balance-beam rear bogie suspension; optional braking on the second front axle, giving a total brake lining area of 1,488 sq. in., and an optional exhaust brake; and optional hydraulic assistance for the A.E.C. worm and nut steering. The chassis is offered with an alternative rear bogie arrangement employing two-spring fully articulating suspension and double-drive overhead worm gear axles with interaxle differential.

The vehicle provided for our test was fitted with the higher-powered AV690 engine and the optional



Drawing showing principal dimensions of A.E.C. Mark V Mammoth Major 8 chassis

and smoother progress and a reduction of the time spent slogging in noisy lower gears with an ade-quately powered vehicle. And withal, there was no penalty of increased fuel consumption; in fact, rather the reverse.

rather the reverse.

The Mark V Mammoth Major, which was first shown at the 1958 Commercial Motor Show, introduced various innovations in this popular trunkhaulage vehicle, some of them standard and others offered as optional extras. Alternative 590 or 690 cu. in. direct-injection diesel engines offered have been developed from the earlier A.E.C. 9.6- and

six-speed overdrive gearbox, which with the standard 6.22 to 1 single driving axle we subsequently judged to be a quite outstanding power-transmission combination, giving a fully laden performance from gradient starting of about 1 in 4 to a top speed well over 50 m.p.h. Other optional fittings on the test vehicle included brakes on the second front axle, contributing to better-than-average stopping power on an air-braked eight-wheeler and marked freedom from fade. The steering servo was not fitted, which was a pity, for the steering as tested was on the heavy side, though low geared

TEST RESULTS AT A GLANCE Test Results ROUTE: Standard route in Kent and Surrey with London addition. CONDITIONS: Generally fine and warm. RUNNING WEIGHT: 23 tons 18½ cwt. (24,321-6 kg.) plus crew of three. PAYLOAD: 16½ tons (16,764-7 kg.), allowing 9½ cwt. for platform body.

Vehicles Details

Maker: A.E.C., Limited, Southall, Middlesex

Type: G8RAS Mark V Mammoth Major Eight-Wheel Lorry.

Engine: A.E.C. AV690 six-cylinder direct-injection diesel; bore 5-12 in. (130 mm.), stroke 5-59 in. (142 mm.), capacity 680 cu. in. (11-31 litres); compression ratio 16 to 1, 153 b.h.p. (net max) at 1,809 r.p.m., 505 lb./ft. (69-8 kg./m.) torque at 1,100 r.p.m.

Transmission: Clutch, hydraulically operated single dryplate 15\frac{1}{2}\$ in. (400 mm.), dia. 282 sq. in. (1,890 sq. cm.) lining area; gearbox, six-speed constant-mesh (exc. first) with overdrive top, ratios 66, 4.44, 2.64, 1.57, 1 and 0.768 to 1 forward, 6.37 to 1 reverse; driveshaft, open tubular with Hardy Spicer 1700 series needle-roller-bearing universals; rear axles, double-reduction single driving and trailing on four-spring balance-beam suspension, standard ratio 6.22 to 1.

Brakes: Clayton Dewandre air pressure system with diaphragm operation and S-cam drum equipment on four axles; total lining area 1,488 sq. in, (9,600 sq. cm.); multi-pull hand-brake mechanical to all four rear wheels.

WHEELBASE: 17 ft. 4½ in. (5-291 m.).

Weight: In kerb trim complete with Park Royal plastics cab, toolkit and so on, 6 tons 19½ cwt. (7,086-9 kg.).

11.3-litre units, retaining their high performance characteristics but designed to the now standard AV-series construction employing integral cylinder block and crankcase, ceramic-coated push-fit wet liners, prefinished crankshaft bearings, hardened cylinder head inserts, stellite-faced valves and Unified screw threads.

High-Torque Engines

and requiring seven turns of the wheel from full lock to full lock, and did not quite match up with the other easy handling qualities of the vehicle.

10-30 m.p.h. 27 sec.

Braking: Average distance to stop from 30 m.p.h. on dry tarmac 54 ft. 6 in. (16-6 m.), equivalent to 17-7 ft. per sec. per sec or 0-56 g. overall deceleration. Don meter readings 70-78 per cent. Handbrake alone 22 per cent Don meter.

Estimated Top Speed: Over 50 m.p.h. (80 km.p.h.).

Overall Fuel Consumption: For 93 miles of mainly hard driving, 20 miles in London suburbs and including low-gear full-rack work in various tests, 7-9 m.p.g. (280 km. per 100 litres).

PAYLOAD: 105 tons (10,100-2 Ag.), anomog over standard 15-mile route 9-5 m.p.g. (3-37 km./litre) at 26-5 m.p.h. (42-4 km.p.h.) average speed.

GROSS TON/M.P.G.: 230 (82-7 tonnes/km./litre).

PAYLOAD TON/M.P.G.: 156-7 (56-35 tonnes/km./litre).

MAXIMUM GRADIENT CLIMBED: 1 in 4‡ (21 per cent).

TURNING CIRCLE: 66 ft. (20-1 m.) wheeltrack, 69 ft. (21 m.) sweep.

ACELERATION:

Averages of four runs, two in each direction, through gears:

0-30 m.p.h. 14 sec.

0-30 m.p.h. 30-6 sec.;
in direct drive:

10-20 m.p.h. 12 sec.

10-30 m.p.h. 27 sec.

BRAKING: Average distance to stop from 30 m.p.h. on dry

Park Royal Plastics Cab

This test gave us an opportunity of sampling the new Park Royal Vehicles plastics cab developed for the A.E.C. range with retracted front axles. Moving the axle back has permitted the leading edge of the cab door to come well forward of the wing, thus making easy steps ahead of the wing possible and eliminating that always rather steep climb for the short driver over the wheel and wing. The second floor-level step is in fact several inches below wing-



The AV690 engine made light work of 24 tons on our hilly test route; here the vehicle is seen about to descend Brasted Hill, having just restarted easily on neighbouring Hogtrough Hill

of 128 b.h.p. at 1,800 r.p.m. and 430 lb./ft. torque at 1,100 r.p.m. and the AV690 (11.31 litres), with 5.12 in. (130 mm.) bore, has maximum output of 153 b.h.p. and 505 lb./ft. torque at like speeds. The ratings quoted are based on British Standards conditions, allowance being made for all standard auxiliaries except the fan

conditions, allowance being made for all standard auxiliaries except the fan.

Among other innovations in the Mark V chassis are retracted front axle, giving rather better manoeuvrability and permitting easier access to a cab with steps ahead of the front axle; alternative five-speed or overdrive six-speed constant-mesh gearbox; double-reduction (spiral bevel and double helical) single-drive rear axle; a new design of four-

top height. The cab itself is of moulded glass fibro reinforced polyester resin, with adequate moulded-in framing and fixings, and offers all the modern amenities of excellent visibility through deep curved glasses, fully adjustable driver's seat, grouped comprehensive instruments in a well-placed panel and convenient controls. It has moreover a patterned interior woven lining cloth bonded to the moulding presenting a perfectly smooth and decorative surface, which we thought was a marked improvement over the roughness of the reverse side of the majority of plastics mouldings.

The chassis as tested complete with plastics cab, the chassis as tested complete with plastics cab, and finely trope and equipment had a target of the chassis.

48 gal. of fuel, tools and equipment had a tare weight of 6 tons 19½ cwt., leaving a margin of just (Continued on page 18)

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Mammoth Major Eight-Wheeler on Test

(Continued from page 17)

over 17 tons for body and payload inside the British legal limit of 24 tons. In fact, the maker's permitted maximum gross weight in countries with-out such legal restriction is 25 tons (25,400 kg.) with the four-spring bogie suspension and 28 tons (28,440 kg.) with the fully articulating bogie. For the test, weights mounted on the chassis frame brought gross weight up to 23 tons 18½ cwt., giving a distribution of 7 tons 16½ cwt. over the two front

magazine, which produces a chalk mark on the road at the point where pressure is first applied to the brake pedal. The diaphragm-operated air pressure brakes were powerful enough to lock all wheels of the rear bogie on dry tarmac and produce heavy marking from the front four wheels. In four stops from 30 m.p.h. the average distance required was 54 ft. 6 in., with a best performance of 48 ft. and a least good of 58 ft. Figures recorded on the Don meter during these stops, giving maximum as opposed to overall deceleration, ranged from 70 to 78 per cent. From speeds of about 20 m.p.h. the multi-pull handbrake alone produced consistent readings of 22 per cent after the usual delay with the progressive-ratchet mechanism of getting the brake fully on.

getting the brake fully on. From the Twickenham area we

From the Twickenham area we drove the vehicle through the south-west London suburbs via Putney, Wandsworth, Streatham and Thornton Heath to Purley Way; in the hurly-burly of heavy mid-morning traffic we came to appreciate to the full its quiet but lively performance. The steering, though heavyish in low-speed manoeuvring, was precise and lightened considerably when running normally and presented no bar to making full use of the excellent recovery from traffic checks without frantic work with the gears. A quite remarkable amount of normal driving could be done in overdrive, which was easily engaged by moving the lever against spring pressure on the side of the gate nearer the driver. On this part of the run the speedometer was checked over a measured quartermile and found to be accurate at 20 m.p.h. and the turning circle, measured on the large car park on Purley Way, was found to be 66 ft. at the wheel-track and 69 ft. at the front wing sweep.

In the Hills a crew of three was carried in addition throughout the test.

Our first objective after leaving the works at Southall was a fairly level section of the Great Chertsey Road for acceleration and brake trials, where performance on both counts was found to be high. Acceleration through the gears from rest to 20 m.p.h. took an average of 14 sec. in four runs, while an average time of 30.6 sec. was required to reach 30 m.p.h. The high low-speed torque was evident in the fact that the slight gradient on the test section made very little difference to the timing of opposite runs; it also provided great flexibility, resulting in the remarkably good direct-drive acceleration figures of 12 sec. from 10 to 20 m.p.h. and 27 sec. from 10 to 30 m.p.h.

Braking distances under emergency conditions were measured as usual with our chalk-firing

In the Hills

In the Hills

After continuing through Purley and Kenley towards Caterham, an assault of long and winding Bug Hill proved the ease of gearchanging in the constant-mesh gearbox, that there was a great reserve of power for a first-gear start on 1 in 6 and ability to restart smoothly and comfortably on 1 in 7 in second gear. In a subsequent climb of the ridge near Brasted, the vehicle was restarted easily in first on 1 in 4\frac{3}{4}, where no difficulty was experienced in holding the 24 tons on the handbrake. Our customary coasting run down Titsey Hill indicated that the Mammoth Major 8 with brakes on all wheels is unlikely to suffer from brake fade on all wheels is unlikely to suffer from brake fade



Pictured at Sundridge on the 15-mile fuel consumption check, in which the vehicle returned 9.5 m.p.g. at 26.5 m.p.h. average speed

axles and 16 tons 21 cwt. over the rear bogie, while a crew of three was carried in addition throughout

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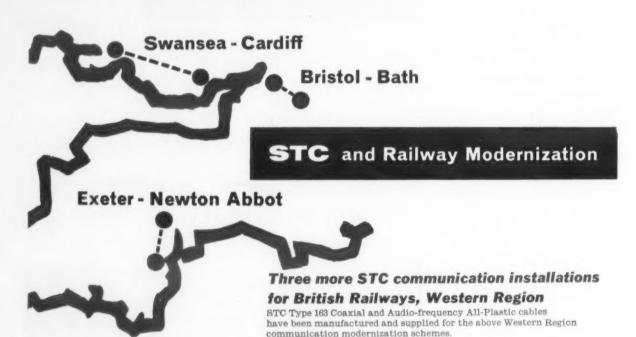
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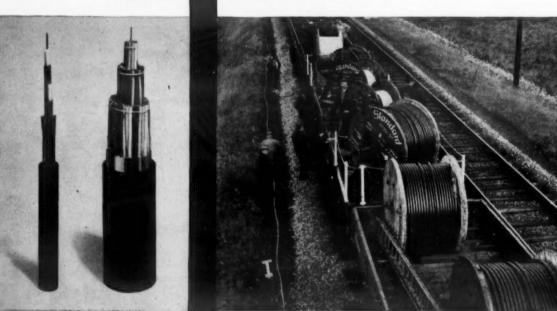
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Pavilion Building, Pavilion Road. West Bridgford NOTTINGHAM 83481



163 Coaxial cable.

Right: 27 Quad polythene insulated and sheathed Laying STC Polythene Coaxial and Audio cables alongside railway track, for direct burial into the ground, between Llanharan and Llantrisant. Each pair of coaxial cores has a capacity of 300 speech circuits. Expanded polythene is used for the coaxial dielectric and solid polythene for the insulation of the audio pairs and for the overall sheaths.





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Entry into the new Park Royal plastics cab is easy with steps and door opening ahead of the retracted front axle

under average conditions. Even with our rather under average conditions. Even with our rather abusive treatment, which is calculated to produce fade if there is any tendency, an emergency stop from 30 m.p.h. while still on a 1 in 10 downgrade produced 50 per cent on the Don meter and brought the vehicle quickly to rest. A further stop on level road after a mile of normal running to ventilate the brakes produced nearly 60 per cent and locked the rear wheels. Descent from the Brasted ridge at a lively pace revealed comfortable riding and excellent stability over poorly surfaced and steeply lent stability over poorly surfaced and steeply cambered country lanes.

Performance Plus Economy

As we have so often found, use of the larger As we have so often found, use of the larger engine provides performance advantages without sacrifice of fully laden fuel economy. In fact, in our usual 15-mile out-and-back consumption check on A25 the reverse proved to be the case. This route is a good deal more restrictive than the average trunk road; it is rather narrow and undulating and passes through several villages. Traffic during this run was such that there were four complete halts and an average speed for the 15 miles of 26.5 m.p.h. That the Mammoth Major completed it for a fuel consumption of 9.5 m.p.g. points to the probability consumption of 9.5 m.p.g. points to the probability of a return better than 10 m.p.g. in normal trunk service loaded both ways, and further improvement when there is some empty running and maximum use can be made of overdrive. Similarly favourable results were obtained in our

check of fuel consumption for the complete day's running. A total of 93 miles was covered compris-ing about 20 miles in London suburban traffic and the many stops and considerable full-throttle low-gear work of the various tests. The result of a point under 8 m.p.g. was impressive.

Improved performance and an easier and often quieter time for the driver are not of course the only benefits to be gained from the use of a big engine. Many operators have already proved that increased life of engine and other running units form substantial additional advantages, while the importance of reduction of anyonyment to other road. importance of reduction of annoyance to other road users in traffic and on gradients cannot be overstressed in the interests of goodwill between different classes of road user.

In general in the Mark V Mammoth Major, A.E.C., Limited, is to be congratulated in develop-

A.E.C., Limited, is to be congratulated in developing what was already a very fine trunk-haulage vehicle into one that is now at the top of its class, even though some of the features that make it so are optional fittings at extra cost. Even greater popularity than hitherto can confidently be forecast for this latest Southall product.

ROAD VEHICLE INDUSTRY

New Road Research Facilities

HIGHER speeds, increasing traffic and the special problems of motorways and other modern roadworks are among the many factors which underline the need for large-scale practical road research facilities. To help in meeting this demand, a new road safety research track is being built at Crowthorne, Berks. By 1964, the site will also house the entire Road Research Laboratory of D.S.I.R.—at present occupying two different centres at Harmondsworth, Middlesex, and Langley, Bucks. Built at a cost of about £500,000, the new track is designed for research in traffic and safety measures with particular emphasis traffic and safety measures with particular emphasis on vehicle behaviour, including high-speed studies up to 80 m.p.h. It is in the form of a figure of eight with a large paved area in the centre. The total length of the track is about 3 miles, and it

Land-Rovers used by the Queen Mother during her visit to the Federation of Rhodesia and Nyasaland in May were finished in Vulcan self-gloss Vulflo, one of the vehicle finishes manufactured by the industrial division of Blundell, Spence and Co., Limited. One is seen here crossing the Kariba dam wall

will contain a number of different test sections and varying types of road surface. Light- and dark-coloured sections will be used to study the effect of colour of road surface on visibility with head-lamps. Provision has also been made for determinants.

lamps. Provision has also been made for determining the effect of various types of street lighting on the visibility of vehicles, cyclists and pedestrians.

One section approached by a banked bend will be covered with typical road surfacings which can be kept wet by means of a built-in watering system. This will permit high-speed skidding and braking studies to be made. Beneath another section there is a laboratory with a special glass panel let into the surface of the track. Photographic studies can thus be made of the contact areas of tyres as vehicles are driven over it. The track will also provide means for experiments on the guidance and control of vehicles in fog. Wires laid below the surface will emit signals which can be detected by simple electronic devices in the vehicles. The ultimate objective of this work is to see whether drivers can be helped to steer a safe course through

test work they saw in progress at Acton, and in the large-scale production of equipment at both

Danger Marker

Introduced by Piggott Brothers and Co., Limited, 220/226 Bishopsgate, London, E.C.2, as an efficient replacement of the present haphazard marking of overhanging loads, towropes and other potential danger sources on the road, Glo-Flag is a 10½ in. by 15 in. fluorescent pennant. It is produced in double-thickness drip-dry nylon reinforced with webbing. The fluorescent properties, which are said to make the pennant more noticeable in poor visibility, are claimed to last over a considerable period of time.

Convenient Mobile Fueller

SELF-CONTAINED fuellers designed for easy SELF-CONTAINED fuellers designed for easy lifting and carrying on any large-enough flatafloored vehicle, developed by Flow Developments, Limited, 6 Stanley Road, London, E.4 (sales office), should be useful to contractors and others with away-from-home vehicle and plant fuelling commitments. The equipment comprises a 210-gal, storage tank, galvanised or not, fitted with lifting eyes, a hand- or engine-driven pump, hose and nozzle. Lugs for bolting down are fitted and a meter is available optionally. Flow Developments has also introduced trailer-mounted washing equipment designed primarily for the cleaning of large road signs such as those used on motorways.

International Harvester Record

International Harvester Record

RECENT completion of the 10,000th BTD6 crawler tractor at the Doncaster works of International Harvester Co. of Great Britain, Limited, prompted Mr. O. G. Voss, the company's managing director, to say, "To the best of our knowledge Doncaster works production of this size crawler tractor must be at a record high—not only for Britain but for the world. We are very proud of this achievement. Increasing demand for the BTD6 from the home and export market is reflected by an order book full for several months to come. Production has been at maximum capacity for many months past." The 10,000th machine, complete with Drott skid shovel, is to be shipped to Australia, one of the company's best customers, where it will be featured at the Brisbane Exhibition in August. in August

Heat Treatment Plant at Leyland

A NEW continuous-cycle annealing furnace recently installed at the Spurrier Works of Leyland Motors, Limited, is the first of its kind in this country. It is used for giving to certain steel forgings, which are delivered in the as-forged condition, suitable preliminary heat treatment which makes them readily machinable and stress free. Five separately controlled zones permit varying cycles of annealing and normalising treatments to be carried out at will. At present the furnace is used for the cycle annealing of all forg-



In a strange land: a front-wheel-drive Italian Romeo 1-ton van pictured recently at the Trojan service depot in Purley Way; right, one of the very few French-built commercial vehicles registered in this country, this Pengot D4 van seen in London also has front-wheel drive

and round hazards even in the thickest fog. Similar electronic devices using energised wire loops in the track surface may also be used to warn vehicles of other vehicles ahead. The very large paved area in the centre of the track will be invaluable for investigations on the layout of road junctions.

New Regent Petrols

New Regent Petrols

TWO new grades of petrol introduced this month by Regent Oil Co., Limited, have been formulated to meet the needs of modern high-compression engines, which are now being fitted in greater numbers not only to motorcars but to the smaller types of commercial vehicles developed from them. Regent Super is a high-octaine fuel and Regent Supreme is classed by the company as a "peak-octaine" fuel. Both grades are claimed to overcome other problems affecting efficient operation, notably carburetter icing, rust formation in the fuel system and carbon build-up in combustion chambers and sparking plugs.

Successful Year for B.P. Lubricants

Successful Year for B.P. Lubricants

THE year 1959 was a very successful one for B.P.
Energol lubricants. Total B.P. sales of lubricants during 1959 increased by some 16 per cent over the previous year. By comparison, the rise in the consumption of all lubricants in B.P. market areas was probably less than 4 per cent. Of the various types of Energol lubricants, the largest increase was in the automotive grades, among these the biggest expansion was in sales of B.P.Energol Visco-Static. By the middle of 1959 each of the B.P. Group's four lubricating oil plants—at Llandarcy, South Wales; Kent, England; Dunkirk, France; and Schindler, Neuhof, Germany—was operating at full capacity. Over the 12 months production was 24½ per cent up on 1958.

American Specialists at C.A.V.

D URING part of May and June a party of officers and members of the Association of Diesel Specialists of U.S.A. visited factories and laboratories of C.A.V., Limited, at Acton and Rochester. At Acton the party saw the new engineering centre and part of the electrical equipment factory. At Rochester they toured the production plant to see the manufacture of fuel injection equipment and, particularly, of the DPA distributor-type fuel-injection pump. The visitors expressed great interest in the large amount of development and

ings made in alloy case hardening steels and certain medium carbon alloy steels and for normalising selected carbon steels. The supplier was British Furnaces, Limited, Chesterfield.

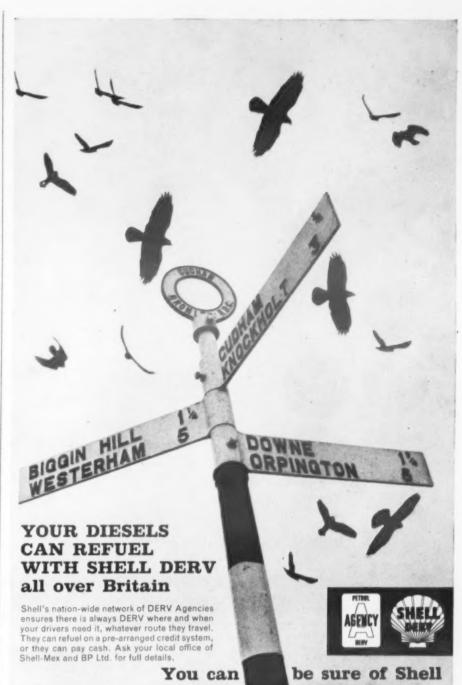
High Performance Tractor

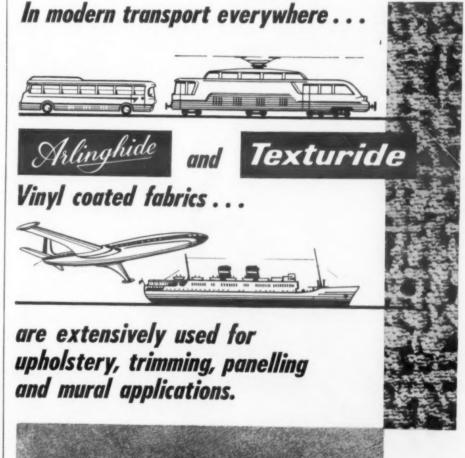
CLAIMED to have the best all-round perform-ance in the world, a new wheeled tractor designed by the Military Engineering Experi-mental Establishment in association with the indus-try is now in quantity production by Marshall



This Guy Wulfrunian 78-seater in striking yellow-black livery, with pneumatic suspen-sion and disc brakes all round, is now visiting prominent Scottish bus operators

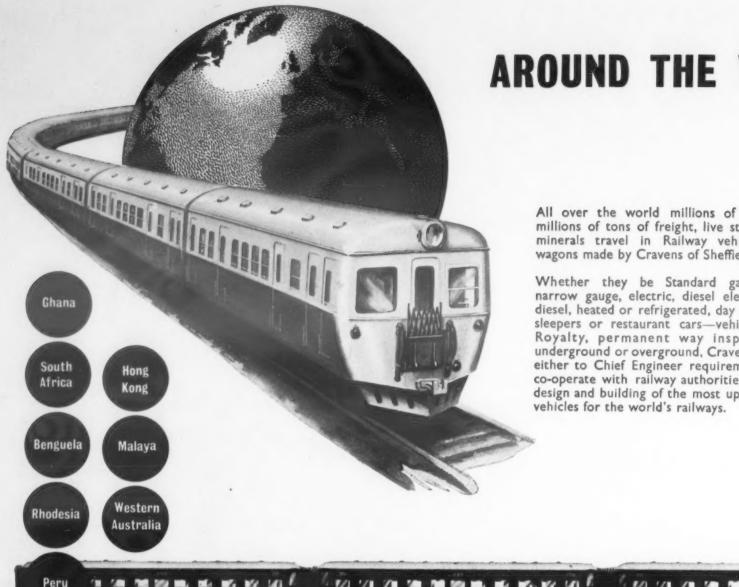
Sons and Co., Limited, Gainsborough. Named Gainsborough, the tractor is powered by a Leyland O680 diesel engine driving through a fluid flywheel, twin-range five-speed air-operated epicyclic gearbox, differentials and epicyclic hub reduction gears to all wheels. Four-wheel steering is power assisted, air pressure-hydraulic brakes are fitted to all wheels and these is a discounter that the properties of the control of the c and there is a disc handbrake on the transmission shaft. Performance ranges from 20,000 lb. drawbar pull in first gear to a top speed on the road of well over 30 m.p.h.





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Friday a.m. Branch Manager J. Webster warned of rush job

To get things moving - get B.

YOU'LL FIND THEM IN THE 'PHONE BOOK

G. M. PULLMAN

(Continued from page 6)

demands from the public for higher standards. Anxious to encourage travel the railroads answered these demands by introducing devices to promote the travellers' comfort, including somewhat primitive attempts to provide a sort of bunk for night

An 1836 Experiment

In 1836 Philip Berlin, manager of the Cumberland Valley Railroad (now part of the Pennsylvania) began experimenting with a sleeping car which ran between Harrisburg and Chambersburg. The accommodation could not have been more spartan.

between Harrisburg and Chambersburg. The accommodation could not have been more spartan. The car was divided into three compartments, the forward one containing 10 ordinary day coach seats, the centre at night had six beds in three tiers, and the last room accommodated two women. Sofa seats, running lengthwise of the car formed the lower berths; the hinged seat backs were drawn upward for the centre bed, and the third was hinged to the car side and swung outward.

In the rear the heavy-eyed travellers who had unsuccessfully tried to sleep while the car jolted its way through the night over the uneven track might wash themselves as best they could with the basin, water, and towel provided there. No bedclothes were provided and passengers, fully dressed (complete with boots) reclined on rough mattresses piling their coats and shawls over themselves. Nevertheless, this innovation at least furnished the passengers with an opportunity to rest and it was warmly greeted.

Inventors Galore

Inventors Galore

Inventors Galore

Inventors galore got to work seeking to adapt ordinary coach seats into beds at night but most of their ideas got no farther than the Patent Office. Their goal meant fortunes could they but reach it. One of these, Charles McGraw, patented a plan for a sleeping car in 1838 and the Baltimore Chronicle reported that "Cars intended for night travel" to Philadelphia were to be run in which you "go to rest in a pleasant berth, sleep as soundly as in your own bed at home, and on awakening next morning find yourself at the end of your journey, and in time to take your passage to New York if you are bent there." Unfortunately, this statement was over-enthusiastic and was greeted with scepticism.

statement was over-enthusiastic and was greeted with scepticism.

For the next decade little, if any, improvement was made in sleeping car design and the Diamond Cars—so called because their windows were that shape—introduced by the New York and Erie Railroad in 1843, still perpetuated the basic concept. These two cars, named Erie and Ontario, were fitted with immovable seats with loose cushions. To arrange sleeping accommodation two iron rods were extended from one seat and fitted into holes in the frame of another, the cushions iron rods were extended from one seat and fitted into holes in the frame of another, the cushions then being moved forward to provide a couch. There were no pillows or bedclothes—just a couch. Unfortunately the upholstery was made of horsehair, to which only the thickest clothing was impervious. It is hardly surprising to find that as a result, travellers went to bed in boots, spurs, and all. Iron bars, massive construction, and bulky upholstery were just a few of the factors which contributed to making these cars too heavy for use and they soon became lineside huts for permanent way crews.

Woodruff

Woodruff

One of the most persistent developers of sleeping cars was Theodore Tuttle Woodruff who was to become one of Pullman's strongest rivals. Woodruff produced a working model in 1854 and received his first patent covering a "method of constructing the seats of railroad cars so that they can be readily converted to couches of sufficient length to enable passengers to lie down comfortably," on December 2, 1856. This original invention provided for couches at three different levels, the lowest being below the line of seats and sufficiently large to accommodate two persons. The back of the seats converted into a second couch to hold one person, and a hinged shelf which was let down from the upper part of the car accommodated another.

Having been granted patents, he formed the company of T. T. Woodruff, consisting of himself and three partners. They built their first car in the workshops of T. W. Mason and Co. of Springfield in October, 1857, and began operating it on the New York Central Railroad. Officials were slow to accept the car and even charged Woodruff full fare for trips he made whilst trying to demonstrate features of the vehicle.

Wagner's Interest

Wagner's Interest

One official at least however was impressed by the possibilities of the car. A former wagonmaker, born in 1817, he was depot master of Palatine Bridge Station, New York. His name was Webster

B.R. DIESELS

Locomotives in Service and Ordered

I NCREASING momentum in deliveries of main-line diesel locomotives to British Railways was reported in the progress report on modernisa-tion issued recently by the British Transport Com-mission, the principal contents of which were sum-marised in our issues dated May 14 and 21. On May 1 over 500 diesel locomotives of 800 h.p. up-wards were already in service and over 1,300 were on order or authorised. The number in service is expected to rise to about 900 by the end of this year and there might be as many as 1,200 in use by the middle of 1961. The accompanying table shows the position of main-line diesel locomotives NCREASING momentum in deliveries of main shows the position of main-line diesel locomotives in service and on order at May 1 last, showing types, manufacturer and numbers authorised but t vet ordered.

Among the locomotives due to be delivered this year are the first of the 22 3,300-h.p. Deltic dieselelectrics ordered from the English Electric Co., Limited. These are the most powerful machines ordered under the modernisation programme and are considered to be the most powerful single-unit diesel locomotives in the world. The Deltics will be put to work on the East Coast main lines between Kings Cross and Edinburgh and an idea of their work potential is given in the fact that the 22 are to replace no fewer than 55 steam locomotives on the principal passenger services between Lonon the principal passenger services between London, Leeds, Newcastle and Edinburgh.

Locomotive type	Total No. ordered and authorised		rdered from Builder	No. in
(800-1,000 h.p.)	270	128	English Electric Co., Limited	50
		44	Associated Electrical Industries, Limited	25
		10	North British Loco-	10
		88	motive Co., Limited Authorised but not ordered	
		270		85
2		-		
(1,000-1,365 h.p.)	700	176	B.R. Works	89
		10	English Electric Co., Limited	10
		20	Associated Electrical Industries, Limited	20
		116	Birmingham Railway Carriage and Wagon Co., Limited	47
		226	Brush Electrical En- gineering Co., Limited	114
		116	North British Loco-	71
		36	motive Co., Limited Authorised but not ordered	-
		700		351
3 (1,500-1,750 h.p.)	272	79	English Electric Co., Limited	-
		45	Beyer Peacock	100.00
		98	(Hymek), Limited Birmingham Railway Carriage and Wagon	7
		50	Co., Limited Authorised but not ordered	-
		272		7
(2,000-2,700 h.p.)	563	325	B.R. Works	30
	363	200	English Electric Co.,	69
		38	North British Loco- motive Co., Limited	5
		563		104
				104
(3,000 h.p. upwards Deltic	ds) 22	*22	English Electric Co., Limited	-
		22		-
		2.4		400
	-			
Grand Totals	1,827			547

(Continued from previous column)

Wagner and he was destined to become Pullman's keenest rival. He was unable to lend support to Woodruff's ideas but instead evolved his own design and with financial backing from the owners of the New York Central lines, formed the New York Central Sleeping Car Company, which later became the Wagner Palace Car Company. Four were built, each having a single tier of bunks and (blessed innovation!)—bedding closets at each end of the cars. This was indeed progress, but the rough and none too clean blankets provided would hardly satisfy the fastidious. Passengers were pleased to find that their welfare was at last being considered and the provision of bedclothes was enthusiastically received, but travellers still persisted in sleeping fully dressed, and continued to do so until the inaugural run of the first Pullman car some two years later.

(To be continued)

The M.I.R.A. Wind Tunnels

(Continued from page 5)

effects. Road tests have serious limitations, being suitable apparently for drag measurements only and even then being dependent on the weather and on the use of a completely built roadworthy vehicle and not just a mock-up as might be used in a wind tunnel. The conclusions that emerged from these investigations were that a model tunnel would be and rates of air flow. investigations were that a model tunnel would be economically sound for testing in the early design stages, but that a full-sized tunnel was essential in the final stages of prototype development.

Moderate Cost

Considering these conclusions and the fact that Considering these conclusions and the fact that the kind of equipment visualised would involve a substantial outlay of capital, it seemed logical that a central organisation like M.I.R.A. should install this apparatus for the benefit of the motor industry as a whole. It was therefore decided that two tunnels should be constructed, one for testing models and the other for full-sized vehicles. They are both of the open-return type in which the air ejected at one end returns slowly to the entry through the surrounding building. The closedejected at one end returns slowly to the entry through the surrounding building. The closed-return type was also considered in which the air is continuously driven round in a confined circuit. This closed-return kind of tunnel is more economical in power than the other, but its construction costs are considerably greater. The equipment at Lindley, which has been designed by M.I.R.A. staff, has in fact been constructed at remarkably moderate cost.

The large tunnel has a flared entry leading to a section with parallel sides in which is set a straightener of honeycomb cross-section. This leads to a contracting section before entering the working zone, which has parallel sides and measures 50 ft. long, 26 ft. wide, and 14 ft. 6 in. and rates of air flow.

The air speed is variable in eight fixed steps between 20 and 80 m.p.h. After passing the working zone, the air is slowed down in a diffuser and finally withdrawn from the tunnel by four fans working in separate ducts. The choice of four small fans instead of one large one was dictated by the availability of Government surplus aircraft propellers at a low cost. The fans are each driven by a separate electric motor, and the motors collectively develop 1,300 h.p. at the maximum air speed of the tunnel.

Quarter-Size Models

The small tunnel is intended to accommodate quarter-size models. It has a similar layout to that of the large tunnel, with flared inlet, a honeycomb straightener set in a short section with parallel sides, a contracting section leading to the working zone of rectangular cross-section, and finally to a diffuser and single extractor fan. The air speed is continuously variable between 20 and 80 m.p.h., with a power requirement of 35 h.p. at the maximum speed. In choosing this maximum speed, it was considered that on a quarter-scale model, being 1/64th of the volume and having a frontal area 16th that of the full-sized version, the aerodynamic forces would be four times greater in relation to the model weight, assuming the same air speed and density. The problem of measurement is thus eased.

Power to Stop gives Freedom to Speed



Photo by courtesy of METROPOLITAN-CAMMELL CARRIAGE & WAGON CO. LTD.

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IMPORTANT CONTRACTS

Metropolitan Line Uxbridge Stock

Complete replacement of existing rolling stock on the Metropolitan Line Uxbridge service is the object of a contract just placed by London Transport with Cravens, Limited, for a further 27 eight-car trains. The value of the contract is roundly £4 million and delivery is planned to follow after the completion in 1962 of the order for new trains of similar type for Metropolitan services to Amersham, Chesham and Watford, also placed with Cravens. The new stock will have unpainted aluminium-alloy bodies, Watford, also placed with Cravens. The new stock will have unpainted aluminium-alloy bodies, rubber suspension, fluorescent lighting and luggage racks. It will provide much more accommodation on the Uxbridge services, especially in rush hours, since each of the 216 cars will have 30 per cent more seats and all trains during peak periods will be of eight cars. Over one-third of the Uxbridge trains at present have only six cars. The new Uxbridge trains will increase by 15 per cent the rush-hour seating capacity of combined services on Uxbridge trains will increase by 15 per cent the rush-hour seating capacity of combined services on the heavily used section of the line between Harrow and London, which is already being increased by 5 per cent under current Metropolitan Line modernisation. They will also give London Transport the opportunity of easing peak travel on the District Line, by transfer of the most modern of the present Uxbridge cars to make more six-car trains up to eight cars and permitting some of the oldest straight-sided District cars to be scrapped.

Sunderland Bus Body Order

Sunderland Corporation has accepted the tender of Park Royal Vehicles, Limited, for the supply of three single-deck bus bodies.

B.U.T. Diesels for N.Z. Shunters

A contract has been secured by British United Traction, Limited, for the supply of 44 vertical diesel engines for installation in 20 twin-engined diesel-electric locomotives (plus four spares) which New Zealand Government Railways is to build in its own workshops. Ten locomotives will be

erected at the Hillside Workshops, Dunedin, and 10 at Addington Workshops, Christchurch. Each locomotive will be powered by a pair of 210-b.h.p. B.U.T. diesels and the electrical equipment will be supplied by A.E.I., Limited.

Leyland Orders At New York Fair

Two large American operators have placed orders with Leyland Motors at the British Exhibition at New York. Customs Cartage, Inc., which operates some 3,500 vehicles, has ordered one Chieftain and one underfloor-engined Claymore chassis and Hertz Corporation has also ordered one Chieftain.

Brighton Trolleybus Replacement

Provisional acceptance has been made by Brighton Corporation of a tender by Leyland Motors, Limited, for 16 Titan chassis and of that by Metropolitan-Cammell-Weymann, Limited, for 16 61- or 63-seat double-deck front-entrance bodies required for trolleybus replacement.

Perkins Diesels in Municipal Vehicles

Half the 64 vehicles shown at the recent exhibition held in conjunction with the Institute of Public Cleansing Conference at Portsmouth were powered by Perkins diesel engines. Only three vehicles were fitted with petrol engines and 32 had Perkins power units. Several Perkins-engined tractors also took part in a display of mechanical handling at a local refuse dump.

Grain Handling At Hull

Grain Handling At Hull
Improvements are to be made to the grain handling facilities at King George Dock, Hull. British Transport Docks has placed an order with Simon Handling Engineers, Limited, Stockport, for additional vehicle loading plant and extensions to the conveyors at the grain silo at the dock. The capacity of three conveyors is to be raised from 120 to 200 tons an hour. The work is a part of the recently announced \$44 million improvement scheme for the King George Dock.

SHIPPING AND SHIPBUILDING

Foreign Lines Join O.T.D.

WHEN Ocean Travel Development, the sales organisation for passenger lines, was first conceived in 1958 membership was confined, with a definite purpose behind it, to British lines. The intention, declared at the time, was that as soon as the organisation had had a chance to overcome the difficulties inseparable from starting up any new venture, the council would be fully prepared to extend membership to any non-British lines who might like to join the organisation. It was foreseen that any policy of opening the doors to all lines at the outset might likely enough produce complications that would hinder progress. In June, 1959, in response to an invitation sent out to non-British lines operating to or from a British port to join O.T.D., Home Lines and the Bergen Line became full members of the organisation. Since then Holland—America Line—Oranje Lines, Royal Netherlands Steamship Company, Royal Rotterdam Lloyd, Nederland Line, United Netherlands Navigation Company—Holland Africa Line have become affiliates. Two Italian lines have also joined on the same basis, the Italia Line and Lloyd Triestino. Invitations have been extended to the Scandinavian, German, French, Greek and American lines to join on the same basis.

New Glasgow Passenger Terminal

OVER a quarter of a million passenger travelled between Scotland and Ireland last year. The The majority passed through Lancefield Quay, Glasgow, and this year regular and seasonal travellers will find an entirely different atmosphere after mid-June when the Clyde Navigation Trust, through its contractor and concessionnaire, Burns and Laird Lings, Limited, opens its new passenger. and Laird Lines, Limited, opens its new passenger terminal. Designed especially for the benefit and greater comfort of passengers travelling between Glasgow and Belfast in the ships of Burns and Laird Lines, a new single storey cross-channel terminal has been constructed on the north side of the company's traver at Lanceful Quay where the company's river at Lancefield Quay where the company's

vessels berth. Travellers will assemble at this reception point and take their ease prior to embarkation. The entire decorative motif of the terminal is based upon the clever and judicious admixture of two patterns of Warerite veneer.

Shipping Movements on Wall Chart

Shipping Movements on Wall Chart

A WALL chart recently installed by Frank C.
Strick and Co., Limited, the shipping
managers and merchants, shows at a glance the
next ports of call for all its ships. This
Movigraph chart, made by Adapta-Charts,
Limited, measures approximately 6 ft. by 5 ft.
The names of the ships (29 of them) are listed down
the left-hand side of the chart, with the names of
the ports along the top. The date that each ship
is expected is inserted under the appropriate port,
in white characters, the actual date of arrival is
shown in red. The result is a clear picture of all
the shipping movements. Movigraph charts consist of perforated plastics panels into which plastics
signals of various shapes, sizes and colours can be
inserted.

Ruling on U.S. Investigation

Ruling on U.S. Investigation

SIXTY foreign shipping companies were ordered by a United States district court in Washington to submit documents for a grand jury investigation into possible violations of American anti-trust laws (Modern Transport, May 21). The judge refused to quash subpoenas issued last December calling for the documents. The grand jury investigation involves about 150 shipping companies throughout the world. Objections to the subpoenas were made by the British, Canadian, Danish, French, West German, Japanese, Dutch, Norwegian and Swedish embassies. The judge ruled that the foreign companies involved must produce records kept in the U.S.A. but he withheld a ruling on whether the companies must produce subpoenaed records located abroad.

FINANCIAL RESULTS

OTES on the trading results, dividends and financial provisions of companies associated with the transport industry are contained in this feature, together with details of share issues, acquisitions and company formations or reorganisations.

Thomas Tilling Acquisition

Thomas Tilling, Limited, which already owns V. W. Motors, Limited, in this country, is negotiating for the acquisition of Mercedes Benz (Great Britain), Limited.

British Electric Traction

In the year ended March 31 the aggregate group profit of the British Electric Traction Co. Limited, was £5.836.834 (£4.615.780). After providing £2.28.133 (£1.937.443) for taxation, group net profit was £3.834.711 (£2.588.337). Allowing for minority interests in subsidiaries, £408.634 (£371.917), the proportion attributable to the parent company was £3.176.082 (£2.284.420). On the £7.470.786 of deferred and "A" deferred ordinary stocks the dividend for the year is 40 per cent (35 per cent). Added to the parent undivided profits account is £652,768 (£148.204), making that account £5,066,626.

CARTER PATERSON

(Continued from page 11)

Manchester, Seacombe and Chester and was reaching Leeds and Huddersfield besides. It had recently

ing Leeds and Huddersfield besides. It had recently acquired Anderson Brothers Parcel Delivery Service and the Liverpool Parcels Delivery Co., Limited, and in 1934 the 50-year-old business of T. R. Nickson, operating mainly to the Wirral peninsula, was added, bringing the fleet up from 32 to over 60 vehicles. Incidentally, Carter Paterson introduced horse vans into this fleet for city collections and deliveries.

In November, 1933, Karriers moved into a new Liverpool depot (more properly a converted railway goods depot at Wapping) to house its much enlarged family. In the following year the small Manchester depot was replaced by a larger one at the L.M.S.R. Mayfield goods station in Boardman Street, in 1936 T. and D. Carriers, Limited, swelled the business by another 12 vehicles and, finally, in 1938, another move was made in Liverpool, this time to Great Howard Street, formerly the home of M.R.S., Limited. The maximum fleet of Karriers

time to Great Howard Street, formerly the home of M.R.S., Limited. The maximum fleet of Karriers was some 77 motors and 15 horse vans and its area of operation had considerably expanded.

To provide visible evidence of association with the parent company, new companies which had been registered for that purpose, i.e. Carter Paterson (North Western), Limited, Carter Paterson (Midland), Limited, and Carter Paterson (Southern), Limited, took over in 1938. The three businesses finally lost their identities after the outbreak of war. the outbreak of war.

The Railway Purchase

Turning back once more to the beginning of the 1930s discussions were shortly to commence between the four main-line railway companies on the one hand and Carter Paterson and Hay's Wharf on the other which culminated on October 31, 1933, in the purchase by the railways of the two interests. Hay's Wharf Cartage with Pickfords, was thus Hay's Wharf Cartage, with Pickfords, was thus divorced from its previous owner. The railways had acquired their road transport powers, each by had acquired their road transport powers, each by its separate Act, in 1928 and there was a feeling, not confined to that side, that there were tasks which could better be performed by the combined resources of road and rail. Each side learned a lot about the performance and capabilities of the other as a result of the setting up of a standing joint committee charged with investigating potential economies, especially, of course, road-rail interworking. From this date, Carter Paterson and Pickfords provincial services tended to concentrate on different areas to avoid further duplication of facilities. Pickfords was already well established in, for example, the West Midlands and South for example, the West Midlands and South

The cost to each railway of these acquisitions was £545,000. At this time the issued share capital of Carter Paterson was £253,000 in ordinary and £365,000 in cumulative preference shares and that of Hay's Wharf Cartage £212,000 in ordinary and £138,000 in preference shares. In January, 1934, the capital of Carter Paterson was further increased the capital of Carter Paterson was further increased to £925,000 by the creation of another 150,000 ordinary shares and the company was made public in the following month. Sir James Milne, general manager of the G.W.R., who with Sir Josiah Stamp (as he then was), chairman and president of the executive of the L.M.S.R., had been instrumental in the negotiations, assumed the chairmanship of both companies. Involved in the operation were 1,450 motor vehicles and 1,500 horses.

(To be continued)



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SOCIAL AND PERSONAL

Chairman of B.O.A.C.

Chairman of B.O.A.C.

THE Minister of Aviation, Mr. Duncan Sandys, has appointed Sir Matthew Slattery, chairman of Short Brothers and Harland, Limited, Belfast, to succeed Sir Gerard d'Erlanger as chairman of the British Overseas Airways Corporation, but unlike his predecessor, he will serve on a whole-time basis, from July 29. His salary will be £8,500, plus an expense allowance of £1,000. Sir Wilfrid Neden, a member of the B.O.A.C. board, is to become part-time deputy chairman, and Messrs. J. A. Connel (vice-chairman of Unilever, Limited), Mr. L. Poole (lately secretary of the Union of Boot and Shoe Operatives) and Sir Walter Worboys (chairman of B.T.R. Industries, Limited) are made part-time members of the board.

** **

Mr. G. E. Curtis, who has retired as district goods.

Mr. G. E. Curtis, who has retired as district goods manager, Broad Street, London Midland Region, B.R., was educated at Oakham School and began his railway career in 1917 as a probationer with the former London and North Western Railway. Soon after he was called to the colours. After returning to the railway service Mr. Curtis received training in the goods traffic and coaching department and held a number of posts in the provinces until 1929 when he was appointed to the development and research section at Euston headquarters. During his period there



Mr. G. E. Curtis

he developed the railway country lorry service, extending transport facilities into remote areas. From 1933 until 1938 he was on the personal staff of the vice-president. From 1938 he was goods agent at Keighley until the outbreak of war when he was seconded to the Ministry of Food as Port Food Movement Officer, Liverpool. In 1942-43 Mr. Curtis went to the United States to advise the British food mission on transport problems connected with food. After the war he held various senior posts in the goods department before being appointed district goods superintendent. Broad Street, in 1953 (since redesignated), the position he leaves on his retirement.

**

Mr. E. J. Pickett has been appointed principal

Mr. E. J. Pickett has been appointed principal executive assistant in the office of the new works engineer, London Transport.

We record with regret the death of Mr. J. M. Twiss, one of the general managers of Skyways, Limited, and who had been associated with Mr. Eric Rylands for 26 years.

Mr. L. B. Hislop, M.R.I.N.A., a Deputy Chief Ship Surveyor of the Ministry of Transport, has been appointed Principal Sea Transport Surveyor with effect from July 1, 1960, in succession to Mr. W. J. G. Hawkins, M.R.I.N.A., who is retiring from the department.

Consequent on the recent appointment of Mr. P. G. James, chief financial officer, London Transport, to be chief accountant, British Transport Commission, Mr. A. G. Evershed, F.C.A., commercial manager, has been made chief financial officer, London Transport, and Mr. E. S. H. Eales, F.C.A., A.M. Inst. T., accounts officer, becomes accountant.

Mr. A. D. R. Watson, B.Sc. (Eng.), A.M.I.C.E., A.C.G.I., appointed district engineer, Inverness, Scottish Region, B.R., joined the former London and North Eastern Rail-



Mr. A. D. R. Watson

way in London in 1936. He was appointed 1936. He was appointed assistant to district engineer, Stratford, in 1949, and assistant district engineer, Peterborough, in 1953. In 1955 he became assistant (new works) in the chief civil engineer's office, Kings Cross, Eastern Region, and in 1953 new works and 1953 new works and modernisation assistant. works and

Ship Co., Limited, announces that Mr. Harold R. Bamberg has been

elected to a seat on the board of the company. He has also been elected a director of Cunard White Star, Limited. Mr. Bamberg is the founder of Eagle Airways, in which Cunard recently secured a controlling interest.

Appointment of Mr. Lionel Harper as managing Appointment of Mr. Llonel Harper as managing director of Dowty Hydraulic Units, Limited, is announced. Mr. Harper was formerly managing director of Massey-Ferguson (Great Britain), Limited. He is at present a member of the board of governors of the National College of Agricultural Engineering and a member of the Ministry of Agricultural Machinery, Advisory Com-Agriculture Agricultural Machinery Advisory Com-

We record with regret the sudden death of Mr. Harold W. T. Young, Chester district traffic superintendent, London Midland Region, B.R. Mr. Young began his railway career as a pass and goods clerk on the former L.M.S.R. in In 1948 he became assistant to the district operat-In 1948 he became assistant to the district operating manager, Rugby, and a year later assistant district operating superintendent, Crewe. This was followed in 1955 by his first period at Chester as assistant district traffic superintendent, from where he was appointed district operating superintendent, Crewe, in 1957. He returned to Chester as district traffic superintendent two years later.

Directors' Team in U.S.S.R.

HEADING a mission of seven which the Institute of Directors sent to the U.S.S.R. this week is Mr. H. C. Drayton, chairman of the British Electric Traction Co., Limited. Another member is Sir Percy Lister, chairman of R. A. Lister and Co., Limited. The party, which is described as a goodwill and fact-finding mission to study problems of Soviet industrial management, is visiting Moscow, Leningrad and Kiev, and is to return on July 5.

Mr. T. S. Arnott, stationmaster at Edinburgh

Mr. T. S. Arnott, stationmaster at Edinburgh Waverley, will retire on July 6.

Mr. T. R. Bilbow, F.R.I.B.A., architect, London Transport Executive, retires on July 9.

Mr. Omer G. Voss, managing director of the International Harvester Company of Great Britain, Limited, since 1954, has returned to the United States for reassignment to an important position for the parent company, of which details are yet to be announced. His successor is Mr. David C. Haney, who came to I.H. in Britain in 1954 as director of sales.

At the annual general meeting of the Society of Licensed Aircraft Engineers, Lord Douglas of Kirtleside, chairman of British European Airways, presents the 1959 gold badge of the Society to Mr. A. G. Nunn, production engineer in charge of aircraft, British Overseas Airways Corporation, for his prizewinning paper, "Modern Aircraft Maintenance Procedures and Techniques." President of the Society for 1960-62 is Mr. I. J. Gregory, A.F.R.Ae.S., chief maintenance engineer, British European Airways.

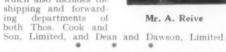
Mr. S. A. Stewart, C.B.E., M.I.Struct.E., A.M.I.C.E., has been appointed director of the British Road Tar Association. Educated at Winchester and Royal Military Academy, Woolwich, he was commissioned into the Royal Engineers in 1924, from which he retired with the rank of brigadier. His last appointment before retiring at the end of 1959 was Director of R.E. Equipment, Ministry of Supply, in which he was responsible for the design and production of all bridging, plant, roadmaking equipment, etc., used by the Royal Engineers.

Mr. S. G. Hearn, former assistant general manager, Eastern Region, has been re-elected chairman of the Metropolitan section of the Institute of Transport for the session 1960-61. The vice-chairmen are Messrs. F. D. M. Harding, R. M. Robbins and F. J. Speight. The hon. secretary is Mr. E. J. Morris, who is to succeed Mr. Cyril F. King. The latter has been hon. secretary of the Metropolitan section from its inception in 1947 Metropolitan section from its inception in 1947 and was hon, secretary of the Metropolitan Graduate and Student Society from 1926 to 1947. He has been elected a member of the Metropolitan section

Mr. A. Reive has been appointed chief executive officer of the shipping and forwarding group of Thos. Cook and Son, Limited, following the retirement of Mr. Lionel G. Stockwell.

Mr. Reive, after a period in shipbroking, has been in the forwarding business for over

has been in the forward-ing business for over 30 years. He is a past chairman of the Insti-tute of Shipping and Forwarding Agents. Mr. Reive is a director of Hernu, Peron and Stockwell, Limited, and England's and Perrott's, Limited, two of the Limited, two of the companies in the group, which also includes the



The Minister of Aviation, with the agreement of the First Lord of the Admiralty, has appointed Captain J. A. Ievers, O.B.E., to be Deputy Controller of Aircraft (Military) in succession to Rear Admiral A. S. Bolt, C.B., D.S.O., D.S.C. Captain Ievers is being promoted to rear admiral and will take up his new duties in July.

The British Transport Commission announces the following staff appointments:

Office of the traffic adviser: Mr. N. R. F. Geiger, head of staff section, D.T.M.O., Paddington, Western Region, British Railways, to be an assistant.

British Railways central staff: Traffic department: Mr. G. H. Young, modernisation and general assistant, line traffic manager's office (G.E.), Liverpool Street, Eastern Region, B.R., to be assistant operating officer.

Mr. A. Roberts, chief distributor, freight rolling stock section, to be assistant freight rolling stock officer (distribution).

Electrical engineering department: Mr. A. H. Cole, senior technical assistant (systems), to be senior technical assistant (power supply) (redesignated).

The London Midland Region of British Railways

nnounces the following staff appointments:

Mr. W. Middleton, to be works maintenance assistant, chief ivil engineer's department, Euston.

Mr. W. C. Clenshaw, to be assistant (design), chief civil maineer's department, Euston.

Mr. W. P. Gibson, to be public relations officer, L.M. divisional traffic manager's office (also Western Region), Birmingham.

Mr. J. F. H. R. Hastings-Stroud, to be public relations officer, cottingham divisional traffic manager's office.

Mr. V. G. A. Pottow, to be assistant district goods manager, Sirmingham (located Wolverhampton).

Mr. M. C. B. Johns, to be assistant district engineer, Manhester.

hester. Mr. W. N. Thom, to be assistant district engineer. Derby (South).

Mr. R. B. Burbidge, to be assistant (land surveys), estate and rating department, Euston.

Mr. G. H. Griffith, to be assistant electric traction engineer, c.m. and e.e. department, Birmingham (temporary located

ednesbury).

Mr. J. H. Capstick, to be assistant district operating superin tendenf, Preston.

Mr. L. W. Taylor, to be assistant district motive power super-intendent, Derby.

Mr. J. T. Hillier, to be assistant works manager, Gorton.

Mr. Arthur L. Blower is to resign from the chairmanship and from the board of Guy Motors. Limited, as from June 30. Because of his many other professional and personal interests he can no longer devote the amount of time he should to the company's affairs. The board has accepted his resignation with regret. Mr. Arthur Chamberlain, M.C., T.D., who joined the Guy board early this year, will succeed Mr. Blower as chairman. Mr. Chamberlain is also a director of J. Brockhouse and Co., Limited, a member of the Western Area Board of the B.T.C., and a member of the Birmingham committee of Lloyds Bank, Limited.

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Door-to-door inclusive rates

ANGLO-CONTINENTAL CONTAINER SERVICES

LONDON 79 Dunton Road se 1 Bermondsey 4881/4 (Head Office) and Elland Road se 15 New Cross 4885/7 (Traffic Depot) PRESTON The Docks Preston 86742/4 LARNE (Northern Ireland) Bay Road Larne 2331/2 BELFAST 35/39 Middlepath Street Belfast 59261/5 MANGHESTER 2 270/1 Royal Exchange Buildings Blackfriars 9287/9 \$LASSSW 10 Bothwell Street of City 6997/8 (Offices) and 17/21 Tylefield Street se. Bridgeton 2277/8 (Traffic Depot) ARBROSSAN (Ayrshire) Harbour Street Salteouts 1911/2 BRISTOL 61 Park Street Bristol 25435/6

COMPANY MEETING

ODHAMS PRESS

Year of Expansion

THE 40th Annual General Meeting of Odhams Press Limited was held on June 16 in London. Mr. A. C. Duncan, F.C.A., chairman, in the course of his speech, said: Last year we were very happy to welcome Sir Christopher Chancellor to

and I have decided to retire from the Chair. manship of the Company after this meeting and I shall then hand over the Chair to Sir Christopher Chancellor, whom the Board have elected and whom I heartily commend as my successor

whom I heartily commend as my successor.

The year under review has, on the whole, been one of expansion and development. Following the purchase of the Ordinary Capital of Hulton Press, Limited, now renamed Longacre Press, Limited, we acquired during the year that of George Newnes, Limited, and, later, that of The Contract Journal Co., Limited. We are satisfied that these acquisitions will materially strengthen the financial and trading operations of the Group as a whole.

Our revenue amounted to £53.645.665. against

Our revenue amounted to £53,645,665, against which must be set Production Costs and other expenditure of £49,706,454. This results in a Trading Profit of £3,939,211. After adding Investment and kindred income and deducting Depreciation and other overhead charges, we have a profit total of £2,955,867, subject to a taxation charge of £1,404,561.

Early in January this year we successfully raised £3,500,000 by means of an issue of 6 per cent Unsecured Loan Stock which was offered to our existing stockholders. Their response was extremely gratifying and the issue was over subscribed nearly

Assets Exceed £40,200,000

The Group's assets now amount to £40,236,965, which is almost double last year's total.

"The People" continues its steady growth and has now a net sale in excess of 5,250,000 copies per issue, an increase of more than 350,000 over the last two years. This net sale represents a readership of, approximately, 15,000,000, a very remarkable achievement in this highly competitive markat.

"The Sporting Life" maintains its position as

"The Sporting Life" maintains its position as the recognised authority in its own sphere.

Our great periodical "Woman," with a net sale of over 3,000,000 copies, maintains its place as a periodical with the largest weekly circulation in the women's field throughout the world, representing a readership of approximately 10,000,000.

"Woman's Realm," launched two years ago, in a different price range, has fully justified our expectations with a net sale in excess of 1,250,000.

"Today." formerly "John Bull." is recognised

"Today," formerly "John Bull," is recognised as the outstanding magazine of its class, with a weekly sale of 900,000 copies, dominating its

Among our many other publications, ''Ideal Home'' keeps its foremost place with a net sale approaching 250,000 copies per issue.

approaching 250,000 copies per issue.

Our Book Department continues to be responsible for a wide range of educational and popular books and Dean and Son, Limited, also publishes a great number of books, catering mainly for the juvenile market. The total book sales of the Group, including these two sections, last year exceeded 16½ million volumes.

With regard to the current year, trading conditions have continued to be satisfactory, although competition continues to be increasingly keen, whilst the prospect of further increased costs is causing us considerable concern.

The report was adopted.

particular market

6 cubic yard mudder



Normal control 6 cubic yard

6½ ton rating with single speed axle — 7 ton rating with two-speed axle
300 cu. in. Bedford-built six-cylinder diesel.
Bedford two-speed rear axle (capacity 18,000 lbs.) giving low ratio for super traction, high ratio for speed and economy when travelling light. Diesel chassis from £1,035, chassis-cab £1,110, tipper £1,355.

Normal control 5 cubic yard

6 ton rating. Powered by 214 cu. in. six-cylinder petrol engine or 300 cu. in. diesel. Single ratio rear axle fitted as standard, but Bedford 2-speed axle available as a regular production option. Petrol chassis £800, chassis-cab £875, tipper £1,040.

Made by Vauxhall Motors Ltd, Luton, Beds.

There's nothing to touch a Bedford tipper's performance in muddy conditions. Cleverly thought-out weight distribution makes sure of maximum traction all the time!

There's nothing like a Bedford for standing up to the heavy impact loading of excavators.

Note the depth of those Bedford FRAMES and those cold-squeeze riveted cross-members! Note the Bedford springs — 45 to 50 inches long at the front with telescopic shock absorbers, heavy duty progressive at the rear.

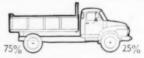
You won't find these tippers shaking to pieces! Even the WHEELS are now welded for maximum ruggedness. POWER UNITS Bedford long-life diesel or petrol; GEARBOXES four or five speed in heavy duty cast-iron casing; AXLES single speed or Bedford's own two-speed job; all are engineered for long dependable service with minimum time out for maintenance.

And always within easy reach, wherever you're operating, there's experienced Bedford SERVICE available with ready stocks of genuine low cost Bedford parts. But see your Bedford dealer — he can tell you every particular thing you want to know.

BEDFORD

Real Mudders

Mud doesn't worry the driver of a Bedford! See how well-designed weight distribution takes care of this.



Laden

When this Bedford 6 cu. yd. normal control tipper is fully laden, 75% of the weight is on the rear wheels, giving splendid traction and lots of grip for slippery gradients. No bogging down here!



Unladen

Even when unladen, half the weight is still on the driving wheels to give grip and prevent spinning in soft ground . . . Smartly into position, smartly away: that's Bedford!